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THE WEEDS, POISON PLANTS,

AND

NATURALIZED ALIENS OF VICTORIA.

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THE WEEDS, POISON PLANTS, AND NATURALIZED ALIENS OF VICTORIA.

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NATIONAL HERBARIUM OF VICTORIA
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PART I.

POISONOUS, INJURIOUS, AND PROCLAIMED WEEDS (NATIVE AND INTRODUCED), WITH THE COLOURED PLATES.

PART II.

CENSUS OF THE NATURALIZED ALIENS AND INTRODUCED EXOTICS.

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PREFACE.

Since the issue of the Thistle Pamphlet in 1893 the number of plants on the Proclaimed List has increased considerably, and under instructions from the Hon. Geo. Swinburne, M.L.A., then Minister for Agriculture, coloured drawings of all the proclaimed plants not previously figured were prepared for publication. These have been issued from month to month in the *Journal of the Department of Agriculture of Victoria* with the technical descriptions of the plants in question.

The present work contains these plates, together with a full account of the properties and best modes of treatment of all our commoner weeds. This has been written throughout in as popular a character as possible, while retaining strict accuracy. Technical terms have been avoided as far as possible, and a short glossary at the end of the work will enable the few used to be understood. The order in which these plates were originally issued does not correspond with the systematic arrangement in this work, but it has been judged best to place the plates by the plants which they illustrate. The complete census of the naturalized plant aliens of Victoria will give some idea of the rapid changes which our Flora is undergoing, changes which, in a large number of cases, are changes for the worse. It is to be trusted that the new Commonwealth Customs and Quarantine Regulations, together with the urgently needed "Pure Seeds Bill," will check or stop the steady flow into Victoria of obnoxious imported weeds.

I have to thank Mr. A. T. Sharp, Assistant Editor of the *Journal of Agriculture,* for reading the whole work, both in manuscript and in proof, and for considerable assistance in proof correction. Mr. J. W. Audas, of the National Herbarium, has aided in the same matter, as well as in the preparation of the Index.

ALFRED J. EWART.

15th September, 1909.

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PART I.

POISONOUS, INJURIOUS, AND PROCLAIMED WEEDS (NATIVE AND INTRODUCED).

The definition of dirt by Palmerston as being matter out of its proper place, may also be applied to weeds. A weed is a plant out of its proper place, and a troublesome weed is one which makes itself objectionable by continually asserting itself in places where it is not desired, and by strenuously, though passively, resisting all attempts to relegate it to its proper place. With the exception of a few parasitic, prickly, or burred plants (Rust-fungi, Mistletoes, Star Thistle, Dodder), hardly any plants are absolute weeds under all conditions, and even the mistletoe by affording food for small birds which are of use in other ways cannot be said to be entirely injurious. No strongly poisonous plant again is an absolute weed, since the very fact that it is poisonous shows that it contains some strong active principle which will be of use to man when extracted.

Thus the Deadly Nightshade yields atropin, ergot, ergotin, *Strychnos*, strychnine, &c., all substances of great use to man. In all such cases it is a question of regulation and control rather than of extirpation. It is only when a plant has entirely gained the upper hand, or is liable to do so, that any question as to the slight usefulness it may possess is entirely overborne by the immediate need for its suppression and the danger of allowing it to spread further. This applies to thistles, which in times of drought when most pasture herbs are eaten or destroyed, and to a less extent in times of plenty may yield the hungry stock a certain amount of food. Nevertheless, a few ricks of hay, silos, or fields of roots are worth more as a drought insurance than all the thistles ever grown.

A plant may become a weed as the result of the spread of cultivation owing to its excessive powers of reproduction and maintenance, coupled with some obnoxious peculiarity. Thus the following native plants are included under the head of proclaimed weeds: The Mistletoe (*Loranthus pendulus* and *L. celastroides*), the Nut Grass (*Cyperus rotundus*; the Chinese Scrub (*Cassinia arcuata*) and the Prickly Acacia (*Acacia armata*). Similarly, on cleared bush, the seedlings of forest trees are weeds, although the adult trees in the original forest might be of great value.

Various factors favour the abundance, increase, and spread of weeds, and these, although more or less inter-related, may be grouped under the following heads:—(1) Deforestation; (2) pasturage methods; (3) grass and forest fires; (4) drought; (5) methods of harvesting and cultivation; and (6) the sale and introduction of impure and infested seed.

Deforestation.—The forests of Victoria rarely attain the density of the pine forests of Europe, which often cut off so much light as to insure the absence of all undergrowth. Instead, a more or less abundant covering of saplings, suckers, grasses, and shrubs grows between the trunks of the trees. When the latter are cut down this undergrowth grows with greatly

increased vigour, and from its character, if once allowed to develop strongly, is more difficult to subjugate than the original trees. Such scrub or sucker growth does not always produce good timber, is frequently diseased, and will in any case usually take a longer time to produce a good timber forest than if the land were freshly and regularly planted. In addition, various weeds from the outskirts of the forest now find suitable conditions for their development, and rapidly establish themselves. No point is more important to the settler on forest land than that he should clear no more land at a time than he can keep clear and free from weeds. Any slackness in this respect soon reduces the land to a condition which, from the point of view of cultivation, is as bad as, or even worse, than when it was under forest. Not only is the land covered with obnoxious vegetation, but the land is fouled with seed from which five to ten years' toil may not be sufficient to clear it entirely. If the timber is removed by felling and burning, each portion of ground should be cleared at one operation, and then ploughed and used for root crops, followed by leguminous fodder crops. Repeated burning over a tract of ground, destroying a little timber at a time, leaves the ground hard, baked, devoid of humus, and peculiarly dead and inert, while the original ash so favourable to the growth of root crops like potatoes has long since been washed out, carrying with it many of the valuable constituents of the soil. To improve the soil, and prevent this loss, farmyard manure or green manuring is essential. To clear forests off steep hillsides is wanton folly. If there is any good soil, the rains and trampling of the stock soon send it down to the gullies, and after a few years' grazing the hillsides become bare and arid. If the ground is rocky, a valuable product has been destroyed without even a temporary gain.

PASTURAGE METHODS.—Few conditions are more favourable to the spread of obnoxious weeds than the open unrestricted grazing, more especially of sheep, so common throughout Australia, and this is still more aggravated when the land is overstocked. The animals wander to and fro distributing the burred, prickly, hairy, or adhesive seeds of various weeds as they go, and continually select and eat out the better pasture plants. Obnoxious, prickly, woody, and poisonous plants are usually left untouched by healthy, well-fed stock, and their growth is favoured by the continual grazing down of the good fodder plants. The condition of affairs obtaining in a well-kept garden is thus reversed, the weeds being favoured, and the useful plants suppressed.

A point which needs to be strongly emphasised is that the stock-carrying capacity of natural virgin pasture is but slight as compared with its stock-carrying capacity when cultivated, or when seeded down after cultivation. In virgin pastures useless weeds and useful pasture plants struggle for the upper hand, and the balance is so delicate that one sheep per acre may be more than sufficient to upset it, and cause steady and rapid deterioration of the pasture. Open sheep pasturage and stock grazing on virgin ground adapted for cultivation is a poor way of utilizing the land, and, granted a moderate rainfall, nearly all ground which the plough can reach and penetrate can be profitably cultivated in the absence of any artificial obstacles. Pastures laid down during rotation farming always yield more feed and should keep freer from weeds than virgin pastures, but even the latter can be greatly improved by manuring, and an occasional mowing is of great value in preventing the coarser non-nutritious vegetation from re-establishing itself.

When sheep are penned on crops raised for their consumption, the whole ground is cleared, weeds that are not eaten are trampled into the ground, the whole of the manure is conserved in one spot, and, if soon turned into the soil, or spread and broken up by spreaders, harrows, or scarifiers, less waste of nitrogen occurs than with any other form of manuring. The future should see this method of sheep-feeding, coupled with the use of root crops and the silo, used on all ground except steep hillsides or rocky ground inaccessible to cultivation. Rape cultivation for sheep has already taken hold in many parts, and is especially important for grain rotations where the large accumulation of nitrogen produced by green manuring with leguminous crops is not so necessary.

Rabbits act in much the same way as freely wandering sheep in favouring weeds at the expense of more nutritious vegetation, although when pressed by hunger they are much more all-devouring. Frequently, well-defined zones can be seen around a much frequented burrow. Firstly, a bare zone, then one where the vegetation is eaten or trodden close and flat, then one where weeds are abundant, and further away still the normal pasturage vegetation. Sheep, and heavy stock generally, when wandering freely over ground wet by rain, do great harm by compressing and puddling the soil, and so lessening its aeration. This diminishes the fertility of the soil for the time being, and by preventing the roots going as deeply as they otherwise would in search of moisture renders the vegetation less prolific, and more subject to drought. At the same time, after every heavy shower of rain, the water, instead of soaking in, will largely run off the surface, washing dissolved mineral matter and fertile soil with it, and thus causing an irreparable loss.

All these actions combined together are especially well shown along the broad stock roads so common throughout Victoria, which appear to be especially adapted for the production and spread of weeds. If broad stock roads are necessary, the parts of each side of the highway should be maintained in good pasture, and as free from weeds as possible by ploughing, shutting off and seeding down whenever necessary. The cost of this could be covered by a toll on all animals using the ground for pasturage either locally or when in transit. Wherever and whenever broad pasturage stock roads become unnecessary, it would pay to allow the land-owners to absorb a third of the road on each side, when, if the provisions of the Thistle Act were put into operation, the land would no longer be a neglected harbouring ground for weeds.

Instances of the disastrous effects of inattention to matters of this kind are abundant. Goats introduced to St. Helena were allowed to destroy the natural forest vegetation, and so prepared the way for the spread of a host of noxious introduced European and American weeds, which have now almost entirely replaced the local flora, which included many valuable economic plants. The Karroo desert of South Africa is largely the result of indiscriminate and excessive grazing. Overstocking and indiscriminate grazing in many parts of the Transvaal have resulted in the production of drift sand covering the vegetation, and producing local deserts. Although such extreme results are not likely to occur in those parts of Victoria which enjoy a high annual rainfall, the deteriorating action on pasturage is always possible, and in the newly-opened Mallee districts, special care will be needed to prevent the establishment of a non-nutrient flora of native and introduced xerophytes and stock-defiers adapted to the artificially enhanced desert conditions.

GRASS AND FOREST FIRES.—The action of these in favouring the spread and increase of weeds is twofold. In the first place, the removal of the original vegetation provides the conditions and in part acts as a stimulus to the germination of the seeds of weeds lying dormant in the soil. In the second place, burning off the vegetation involves a great loss of humus, which most Victorian soils can badly spare. The loss of humus means not only a decrease of water-holding capacity and a diminished aeration, but also a fall in the solvent action upon the mineral constituents of the soil. In addition to this, the retentive capacity of the soil for soluble mineral constituents is diminished by the loss of humus, so that the waste by drainage increases. It is for this reason that heavy dressings of soluble manures are inadvisable on soils poor in humus.

The impoverishing action of frequent grass and forest fires on land is very pronounced, and is very strikingly shown in some parts of Ceylon, where it is the custom of the natives to burn off the larger vegetation annually, or oftener, in order to secure a temporary grazing ground for stock. The result is that certain good forest lands, some of which might be cultivated after proper clearing, are in the process of conversion into arid wastes, or into tracts of scrubby jungle of the most objectionable character.

Nature cannot be ruthlessly robbed and maltreated with impunity. Repeated fires favour the survival of plants whose demands are easily satisfied, and which have either air-borne or long-lived seeds. To this class most weeds belong. Its modest demands enable the weed to develop on an impoverished soil, on which long-lived seeds are ready to spring up as soon as the way is cleared for them, while air-borne seeds are continually carried to the newly-cleared ground from neighbouring unburnt regions. These factors operate so constantly, and with such success, that in many parts special plants are recognised as "fire-weeds," owing to the way in which they spring up after every fire.

When the amount of ash is great, and especially if it is derived from the burning of trees, it contains large quantities of potassium and some sodium carbonate, both of which substances are strongly alkaline when present as normal carbonates, and give an injurious alkalinity to the soil. In burning off forests, the ash was often used, especially in the early settling days of the densely wooded States of North America, as a source of potassium carbonate (black and pearl ash). These alkaline ashes in the soil act upon the hard seed coats of the long-lived seeds in the soil, and by softening them prepare the way for their germination, and this is one of the chief reasons why in Australia, for instance, Wattles so often spring up on burnt forest ground on which none grew within the memory of man. In addition, the actual heat of the fire may partially char the hard coats, or render them permeable to water, without destroying the seed within, which swells and germinates as soon as the soil is moistened.

I have found the 50 and 60 year-old seeds of various species of *Acacia* to be still germinable on softening or filing the seed coats, and some of the plants thus raised are now growing in the Botanic Gardens.

Once any accumulation of alkali in the form of potassium or sodium carbonate has taken place in a soil deprived of its humus, the soil can only be rendered fit for ordinary economic plants by the gradual removal of the alkali by the rainfall. When this is slow or imperfect, we get sterile soil having the character of the bad lands or alkali lands of North America. If the alkalinity is not excessive, and nitrogenous humus is present in the soil, nitrification converts the carbonate into nitrate, and so

provides a food substance of which, in the case of potassium nitrate, both base and acid can be used, and are used, by the plant, but any strong alkalinity prevents the commencement of the nitrification processes. In other words, the complete burning off of a dense forest may produce an immediate deterioration in the surface soil from which recovery may be slow and difficult. On such soils, crops like potatoes, which have relatively high potash requirements, are eminently suitable, and give good results if the amount of alkaline potash is not too great.

DROUGHT.—With very few exceptions, these being mainly forage plants, no economic plants of any great value show a pronounced power of resistance to drought conditions, cereals being among the most resistant of ordinary crops. Most cultivated plants suffer severely, and are stunted and dwarfed, even by moderate drought. This applies especially to all fruits, vegetables, and root crops, where the parts eaten are succulent and closely dependent upon free supplies of water. It follows, therefore, that drought conditions favour weeds at the expense of cultivated plants. Temporary periods of very severe drought favour rapidly growing and freely seeding weeds, or plants perennating in dry periods by means of underground bulbs or tubers. Less intense, but more prolonged and generalized drought conditions, favour deeply rooting permanent weeds, and encourage the survival of scrubby, spiny, or more or less leafless shrubs, as well as of a few drought-resisting trees. Many supposed drought-resisting trees survive only because their roots reach permanent ground water, and such trees are really only resistant to temporary or superficial drought.

Although most weeds, as compared with cultivated plants, are relatively favoured by drought conditions, many of the more luxuriant ones thrive especially well on moist ground. Thus the finger-grass or crab-grass, *Panicum sanguinale*, thrives to such an extent on well-watered garden soil, that by a false association of ideas some gardeners have termed it the Yan Yean water weed, or water grass, supposing that the water brought the seeds. This plant is a specially good case of a useful fodder plant, which is a troublesome weed in gardens and cultivated ground out of its proper place. The same applies to the Johnson grass (*Andropogon halepensis*), which on this account has actually been proclaimed in California, so troublesome has it become as a weed of cultivated ground. Since this latter plant is only of use for fodder, and not for grazing, it may also be classed as a weed under the prevailing conditions in Victoria.

METHODS OF HARVESTING.—Cleanly, thorough, and timely harvesting is as important a factor in keeping the ground clean and free from weeds as is cultivation. The barbaric method of harvesting wheat by the combined reaper and harvester, leaving the straw standing, is fortunately only a passing phase of agriculture, and will cease as the land becomes more valuable owing to the increase of population and spread of closer settlement. Among the standing straw, all kinds of pernicious weeds ripen and shed their seed, and since many of these seeds retain the power of germination for three to ten years, or more, the fouling of the land increases steadily along with its impoverishment. Very little land will stand treatment, or rather lack of treatment, of this kind, even for so short a period as ten years, without its value and productive capacity being seriously impaired, and where prehistoric land-scratching methods of agriculture prevail it is futile to complain of the spread of weeds, or to expect their suppression by an Act or proclamation.

Even if the standing straw is burnt off, this is usually done after most of the weed seeds are shed, and besides being an extremely dangerous prac-

tice, it involves an enormous waste of humus and nitrogen, which, if properly applied to the soil, would be of the utmost value. If the straw were cut into two lengths, and at once ploughed in after reaping, the soil would be correspondingly enriched, and the multiplication of weeds checked. The only really satisfactory method of dealing with the straw of cereals is, of course, to use it as bedding for stock, or chaffed with crushed oats, beans, &c., as food for stock, especially horses. The objection to this is that in large wheat-growing areas the amount of straw is far greater than can be consumed in this way under present conditions. Closer settlement will ultimately provide a use and market for the straw. When properly utilized and returned to the soil in the form of manure, weed seeds are very largely, and in many cases entirely, killed during the fermentation of the manures. Many of those with hard resistant coats are softened by the digestive juices, or by the ammonia produced during fermentation. The higher temperature to which they have been exposed aids their subsequent germination, and when ploughed in after the manure has been applied the seedlings are destroyed.

Factors of this kind make all the difference between foul and cleanly farming, and are of as great importance to a landlord as to a tenant. The latter, if he set himself to skim the cream off the land, could afford for several years profitably to pay double the rent possible to a farmer who attended properly to the cleanly cultivation and enrichment of the soil, but ultimately the landlord as well as the general public would lose greatly by the continued practice of such agricultural brigandage.

The alarming spread of the St. John's Wort through cultivated land in recent years is simply and solely the result of insufficient and imperfect cultivation. In England, where the plant has existed from time immemorial, though fairly common, it is mainly found on hillsides, and gives no trouble on cultivated land. Ploughing and manuring easily keep it under, and good rotations are fatal to it. Along with many others of our proclaimed weeds, including all the annual ones, these have become dangerous simply because of insufficient cultivation, scattered settlement, careless clearing, and the other factors already mentioned.

SALE AND INTRODUCTION OF IMPURE AND INFESTED SEED.—A very regrettable feature in the spread of weeds has been the utter lack of control in regard to their introduction from abroad, and the way in which introduced and native weeds have been spread from district to district with impure agricultural seed. We frequently receive enquiries as to whether particular plants are worth while introducing, and, as often as not, the plants in question are either hopeless weeds or have some obnoxious peculiarity which renders their introduction inadvisable. In such cases the mischief is scotched before it has begun, but there is the strongest reason for believing that there are a number of unqualified persons continually introducing new plants, and allowing them to spread, without inquiring beforehand whether the plants are likely to be of use or not, or taking any trouble to eradicate them when the plants get out of hand. Very many such plants appear to be brought in as medicinal plants, though often highly obnoxious or poisonous. St. John's Wort appears to have been established in that way. A correspondent recently proposed to disseminate the Deadly Nightshade (*Atropa Belladonna*); another seemed to have a special fondness for the Dandelion; a third wished to introduce several troublesome English weeds which have not yet gained a foothold here, and the "work" of this kind which goes on out of our ken is probably considerable.

It is not too much to say that no new plant should be introduced to this State, and not even in a private garden, if there is any chance of its spreading, unless an official report on its capacities for good and evil has been obtained, and unless the report is a favourable one. Although the annual loss due to weeds is difficult to estimate, owing to its generalized and diffuse character, there can be no doubt that if suitable regulations had been in force fifty years ago the country would now be saved an annual loss of several hundred thousand pounds. It must further be remembered that the spread of certain weeds means an immediate decrease in the capital value, more especially of grazing land. The first step towards stopping the admission of injurious alien weeds has recently been taken by the Commonwealth Customs by prohibiting the entry of the seeds of nearly 100 of the worst weeds such as are common impurities in improperly cleaned agricultural seeds.

Even at the present day, much can be done to prevent further trouble by the introduction of suitable regulations for the external and internal trade in seeds. In regard to external trade, it might be made a punishable offence to import seed through the Post Office without a special permit from the Agricultural Department or Federal Customs, or except through the agency of a recognised seedsman issuing a printed catalogue approved by the Department. Seedsmen's catalogues do not include plants whose exclusion is desirable. Certain officials would naturally be exempt from this provision, such as the Director and Secretary of Agriculture, the Government Botanist, the Director of the Melbourne Botanic Gardens, the heads of the Agricultural Colleges, and the Curators of recognised Botanic Gardens. Foreign packets of seeds sent in defiance of this regulation could be seized at the Post Office, and only forwarded if certified innocuous, and free from the seeds or spores of parasitic plants.

It is, however, somewhat doubtful whether the good such regulations would do would sufficiently compensate for the trouble and difficulty of carrying them out, and it would probably suffice if public attention were drawn to the fact that a new obnoxious weed may be started as easily from a pinch of seed imported through the post as from a sack of seed imported by a seedsman, which latter is readily accessible to Customs control. Fodder and packing material, discharged ballast, &c., are, for instance, beyond control, and form a common source of new alien weeds. Much good is to be hoped by internal regulation of the seed traffic upon something like the following lines:—The sale of seeds should be brought under similar regulations to those which apply to milk, butter, and other food articles. It should, for instance, be made an offence punishable by fine to sell or expose for sale any seed containing a prescribed percentage of foreign impurities, the term seed to mean the actual seed, together with such coverings or appendages as normally adhere to it when it falls from the plant. In regard to the amount of water present in the seeds, although it is true that the purchaser loses when buying by weight imperfectly dried seeds, no satisfactory general regulation could be made. All "dry" seeds contain some water, often as much as 5 or 10 per cent., and in the case of seeds surrounded by a dried succulent fruit, the percentage may normally be still higher, and this without detriment to the seeds. In addition, some seeds (Willows, &c.) are killed by severe drying. If the allowed percentage of water was placed fairly high, say, 15 or 20 per cent., a regulation to that effect would do no harm, but neither would it do much good, for no seedsman would risk damaging his seed by watering to increase its weight.

In regard to the germination of the seeds, great variation is shown, even in carefully prepared and ripened samples. A very good sample of any of the more minute seeds may not show a germination percentage of more than 50 per cent., owing to the large number of infertile seeds. This is especially the case with the small seeds of most Eucalypti and other Myrtaceæ, as well as many Scrophulariaceæ, Solanaceæ, &c. Even careful fanning and sifting will not always fully separate the light, infertile seeds from the ripe and heavier fertile ones. No hardship to the seedsman and a great convenience to the agriculturalist would be created if it were enacted, on pain of penalty, that all seed sold without warranty must have a germination value of over 90 per cent. for cereals, lucerne, clover, and all legumes, and over 85 for grasses and seeds generally,* and if below that value the seller must notify in writing with the seed whether the percentage germination is over 75 per cent., over 50 per cent., over 25 per cent., or over 10 per cent. To avoid unnecessary interference, small quantities of seeds made up directly to the order of the purchaser could be exempted, say, 1 oz. or less of seeds not exceeding $\frac{1}{8}$ inch, 2 oz. under $\frac{1}{4}$ inch, in any dimension, and 4 oz. under $\frac{1}{2}$ inch, and 8 oz. of all larger seeds. To insist upon the age of the seed being given would be quite unnecessary and impossible to enforce, since, while the germination power of some seeds rapidly decreases after they have ripened, that of others is maintained almost unimpaired for several years.

The adoption of the regulation as to germination power would involve the establishment of a seed-testing branch in connection with the Agricultural Department, where samples of seed could be tested either free or at a nominal cost, and certificates of germination power given. A branch of this kind could be run in connexion with the Botanic Gardens, or at the University, and with great advantage to seedsmen and the public. The former are often unjustly accused by the public of selling inferior seed, simply because the purchaser does not understand how to raise the seed in question, or plants it in improperly prepared ground, or at an unsuitable time. On the other hand, as in the United States, enormous quantities of bad, foul, or adulterated seed, especially agricultural, are sold in this country, and this seed is of internal as well as of external origin.

The purity of a sample of seed is quite as important a factor as its germination power. There can be no doubt that the time has come to prohibit the sale of material containing the seeds of proclaimed weeds, or of parasitic plants, such as Dodder, the penalty inflicted being proportionate to the impurity of the seeds and the quantity sold. It might at the same time be made an offence to sell any seed containing 5 per cent. or more in number of any other seed present as an impurity, or containing 1 per 1,000 or more in number of any plant listed as a troublesome or injurious weed. Absolute prohibition, coupled with a deterrent penalty, is, however, the only remedy for the sale of seed fouled with that of proclaimed and parasitic plants. One Dodder seed per 100 of clover is, for instance, sufficient to destroy a whole crop, and even 1 per 1,000 is sufficient to so badly infect a field as to render it advisable to immediately plough in or to burn off all infected patches of the whole crop with sawdust, shavings, or dead leaves and kerosene, since otherwise the land may be infected with seed for several years. Many of our proclaimed plants have been spread throughout the State, not so much by wind or animals, as is usually supposed, but to a far greater extent by the sale of

* It would be best, however, to leave the percentage to be specified by the Departmental regulations, since while Rye Grass should be over 90 per cent., Meadow Grass is rarely over 75 per cent., however good the sample may be.

impure seed, and to a less extent by the transference of fodder, &c., from one district to another. This applies more especially to St. John's Wort, Dodder, Wild Mustard, Chamomile, Digger's Weed, Thistles, Docks, and to a less extent to Ragwort, Stinkwort, and Guildford grass, the seeds of the latter plant being sometimes found among early flowering grass seed. Thistle seed usually travels a very short distance before it falls to the ground; it is the disarticulated pappus which is often carried by the wind for miles. While the seed is attached the fruit is too heavy to go far, except during high winds, and these usually cause the pappus to break off soon, and leave the seed behind. Even the fruits of the Dandelion and Sow Thistle fall for the most part to the ground within a few feet or yards of the plant producing them, and it is usually only stray seeds which are carried to a distance of more than 30 or 40 yards. In addition, a tall paling fence or a close hedge is usually sufficient to arrest them, and the latter especially is of great importance in arresting the spread of the air-borne seeds of weeds from one field to another. Hedges and fences act in a similar, though indirect, fashion in checking the carriage of adherent, hooked or burred fruits by stock.

Suppression of Weeds.

There are certain general methods applicable to all weeds, others applicable to annuals, but not to perennials, and others, again, which are of use only under special conditions, or for a particular plant or group of plants.

ANNUALS.—The chief factors are the length of time required to produce seed, the amount of seed produced, and the length of time it lasts in the soil. The old saying that "one year's seeding is seven years' weeding," though applicable to some weeds, is an exaggerated statement for most. The majority of annual weeds can be practically suppressed by two or three years' careful and cleanly cultivation. When the surface is very foul with seed, one deep ploughing, by turning the seeds into the deeper layers of the soil where they do not germinate, is a great aid to cleaning the soil. If, however, this means bringing up much subsoil, very heavy dressings of farmyard manure will be needed to keep the soil open and well aerated. The so-called "poisonous" action of subsoil when brought to the surface is, in nearly all cases, simply due to its deficiency in humus causing it to have a strong tendency to puddle, cake or pan, and so form an impervious layer shutting out air from the fermenting layers richer in humus which have been turned below. As a result, the roots are unable to strike deeply or develop freely, and the plants are not only starved but liable to suffer from drought. All cultivated plants of any size, and especially cereals, are rooted not so much in the surface soil as in the unploughed subsoil below the upper 6 to 10 inches, and it is this layer which is the medium from which the water and salts are mainly derived; although they may be washed down from the surface layers. Most annual weeds root to a greater extent in the surface soil than in the subsoil, as compared with the majority of the larger cultivated plants, and hence surface harrowing does much to keep such weeds under while the crop is young, without appreciably injuring the latter, especially if sown in drills.

When annual seeds are turned in by deep ploughing, they should remain undisturbed, if possible, for at least three years or longer, if the seeds are to die. Only the seeds of relatively few weeds last in the soil for a longer time than this.*

* Full details of the duration of vitality of seeds are given in the work on "Longevity of seeds" (Proc. Roy. Soc. of Vict. 1908, pp. 1–210).

An equally effective mode of treatment is, however, to cultivate a crop, such as potatoes, during whose growth the ground is kept frequently stirred so that even weeds which ripen and shed their seed in six weeks' time (Chickweed, Pimpernel, &c.) have no time to do so. When a field is very foul it is advisable to plant the rows as close together (16 to 22 inches) as can be done without the last workings destroying the runners. This applies especially on moist ground, whereas, under drier conditions, in good deep soil where the rows may be 27 or 30 inches apart, even though plenty of light reaches the ground between the rows, the seedlings have little chance of establishing themselves in the dry surface soil. Leafy fodder crops like maize or sorghum are equally useful to suppress seedling weeds, provided they are planted in drills close together, and the weed seedlings kept down during the early growth of the crop.

PERENNIALS.—Here, the prevention of seeding must be combined with the rooting out and destruction of all perennial parts, especially when these have the nature of runners, bulbs or rhizomes. All weeds with single bulbs or corms (Guildford Grass, Daffodils, Field Garlic) are easily kept under by ploughing and cultivation, especially if coupled with manuring and rotations, and if care is taken that the ground is either worked or covered with a strong crop at the time when the leafy growth of the weed is most active.

The same applies to weeds possessing rhizomes or runners, such as the different couch grasses, several of the creeping sedges, sorrels, &c., except that in this case the rhizomes and runners must be raked together in heaps and burnt after the land has been ploughed and harrowed. The ploughing in this case should usually be a very shallow one, so that the sod is cut just beneath the rhizomes and no deeper.

In the case of plants with deep vertical tap roots and a stock on top (Dandelion, Dock, &c.), very careful raking or even hand picking is necessary and the ploughing should be deep enough to pass beneath the thicker portion of the tap-root. Any large portion of the latter left in the soil will start a fresh plant. The St. John's Wort needs similar treatment, and at first combines the disadvantages of the Dock and Couch Grass as regards its eradication. It soon succumbs to continued good cultivation, however, instead of thriving under it as some weeds do.

In the case of all perennials, for the prevention of their re-establishment by seed after the ground has been cleared from the vegetative perennial parts, much the same treatment is required as for annuals. There are, in addition, a variety of special modes of treatment which apply to special plants or to parasites and these will be given in connexion with the plants with which they deal.

WEED SUPPRESSION IN SPARSELY SETTLED DISTRICTS.—The greatest opposition to the application of the provisions of the Thistle Act is not in all cases experienced from such districts, although it is precisely in such districts that the problem is most difficult. Nevertheless, many large and small owners prefer to hold their land as a harbouring place for weeds from which a little grazing can be snatched, rather than properly utilize and cultivate it, for pastures are as open to cultivation and improvement as ordinary arable land and are bound to deteriorate in the absence of proper care and treatment. It is not too much to say that all land which an owner cannot keep reasonably free from weeds and which cannot be otherwise utilized should grow timber, and the amount of land in Victoria upon which useful timber cannot be grown forms but a small percentage of the total area.

Hence, a common fault in newly opened districts should be avoided: it is to clear away all timber indiscriminately without regard to the acreage which the occupier can reasonably expect to keep in good condition. Any policy which, for the sake of the immediate present, tends to favour future trouble with weeds is a short sighted one, and such statements as that Saffron Thistle, for instance, instead of decreasing the carrying capacity of the land had precisely the opposite effect, are likely to do serious harm unless strenuously contradicted. Only a mistaken self interest could dictate so obvious a mis-statement, but unfortunately apologists are not wanting for the majority of our most obnoxious weeds.

Poison Plants.

In regard to poisonous plants, all those which contain undoubted poisonous principles in such quantity and condition as to be openly dangerous to man or animals are marked thus :— ☞

In very many cases, however, considerable doubt exists as to whether plants supposed to be poisonous are really so, and it is exceedingly difficult to obtain exact information in such cases. The poisonous qualities are usually greater when a plant is in flower or fruit than when it is in leaf, and hence a poisonous plant may not be detected for some time, especially if stock reject it as soon as it begins to flower. On the other hand, starved or travelling stock when suddenly turned into rich luxurious pasture are peculiarly apt to gorge themselves and to suffer in consequence. The mere change of pasture often has a similar effect, although in many cases the stock suffer or die by eating plants new to them which they have not as yet learnt to avoid by experience.

Again, when stock are starved or have abnormal appetites as often obtains in breeding or milking cows, they may suddenly take to devouring plants and other objects which are injurious to them and which they had previously learnt to avoid. Finally, plants when diseased or affected by fungi may become injurious although normally quite innocuous. Hence, it is exceedingly difficult or impossible to draw a definite line of demarcation between poisonous and non-poisonous plants. The usual origin of the report as to the poisonous character of a plant is that some stock die, and the nearest plant is selected as the scapegoat, without any *post mortem*, experiment or investigation of any kind. In some cases, this is done purposely when the stock have really died from anthrax or similar diseases. On future occasions, it is usually easy to find the suspected plant somewhere near where the stock have been, and so reports continue to come in. If the plant cannot be found, then some other plant is credited with poisonous properties.

Such reports were accepted with almost childish faith by Mueller and even by later authorities, and as a consequence some harmless plants of slight but undoubted fodder value are widely reported to be poisonous, and of the total recorded as poisonous probably not one-third are actually so.

The only possible definition of a poison plant is that it is one of which small doses exercise some internal, irritant narcotic, or chemical action on the animal which produces serious or fatal consequences either directly, or as the result of an after-effect or cumulative action. To class woody or fibrous indigestible plants as poison plants because stock may die, when forced by hunger to eat them, is ridiculous. We might as well class leather as a poison because a man forced to eat leather by hunger is likely to suffer seriously in consequence. So long as stock are well fed such "poison plants" do harm only by taking up the room of more nutritious ones. In

the following pages, therefore, a detailed account is given only of the undoubtedly poisonous plants, and of the others a full discussion will only be found where the plants are so abundant as to be troublesome weeds.

Proclaimed Plants.

A coloured plate and a simplified technical description are given of each plant proclaimed since the issue of the Thistle Pamphlet in 1893, and in regard to the Thistles figured therein a simple key for identification is given, which will be found more useful for diagnosis than the cumbrous, involved and, to the farmer, more or less incomprehensible descriptions of the Thistle Pamphlet. Compliance with the directions for eradication given for the different proclaimed plants will serve as a defence from prosecutions under the Thistle Act. Hence, only short, safe, straightforward directions for eradication are given, since the fancy methods of weed eradication frequently advocated are less certain, are frequently dangerous, and are often as costly as the simple and thorough, but more laborious methods.

Poisonous sprays such as copper sulphate (2 to 3 per cent. strength) may sometimes be used to keep down weeds (Charlock, &c.) in the seedling condition among cereal crops, especially if applied during dry weather, but their use is never advisable if it can be avoided, and when once a perennial is firmly rooted its destruction requires doses of poison sufficient to injuriously affect the soil and surrounding vegetation for some time. No compounds containing arsenic should be used for the poisoning of weeds on pastures or cultivated ground.

There is no doubt that many of the proclaimed weeds here described are spreading rapidly, with increasing injury to agriculture, and that this fact is due to the imperfect administration of the Thistle Act. In so far as the latter is due to ignorance, the issue and wide circulation of the accompanying descriptions and plates should remove one source of laxity, but the wide divergence in the attention paid to the Act in neighbouring shires will always militate against the permanent eradication or suppression of any particular weed. Permanent good can only be attained by simultaneous and centrally organized efforts, extending over wide areas surrounded by natural barriers to migration.

DETAILED ACCOUNT OF THE COMMONER WEEDS.

Dicotyledons.

Seeds with two cotyledons. Flowers rarely with the parts in three. Herbs, shrubs, or trees, the latter with a growing cambium layer between the wood and the inner soft layer of bark on the stem.

POLYPETALÆ.

The petals free in each flower from base to apex.

Thalamifloræ.—All the parts of the flower, sepals, petals, stamens, and carpels arise separately and regularly from the top of the flower stalk, termed by botanists, the thalamus.

RANUNCULACEÆ (BUTTERCUP FAMILY).

Annuals, or perennials with tuberous, bulbous or rhizomic underground parts. Herbs usually with five sepals and petals, and numerous stamens. Petals sometimes absent. Fruits small, one seeded, clustered on top of the

flower stalk, or in the form of one to many, several seeded small pods. Found over the whole globe but mainly in the cool and temperate regions.

Nearly all the members of the order have a strong acrid juice which, although not poisonous under ordinary circumstances, renders them unpalatable to stock, and unsuitable as fodder plants. Dried in the form of hay this character is partly lost, and if not too abundant, the presence of "Buttercup" herbage in hay does not appreciably detract from its value.

Many of the order are marsh loving or even aquatic plants. Apart from those which have a decorative value as garden plants (Globe flower, Columbine, Larkspur, &c.), and a few which yield medicinal extracts (Aconite, Hellebore), no members of the order have any economic value. Although the order includes many troublesome weeds, especially among the genus Ranunculus, only two appear to be at all serious pests in Victoria.

Ranunculus muricatus, L. The Soft Crowfoot. A native of the Mediterranean regions, especially common in Greece. It is a small intensely acrid plant, with small roughened fruits. It is useless for grazing and of little value even in dry fodder. It prefers moist ground where it is difficult to eradicate. Drainage and cultivation or the encouragement of the larger pasture plants and grasses will keep the plant under. The Swamp Lotus or larger Bird's-foot Trefoil (*Lotus corniculatus*, L., var. *uliginosus*) is especially useful for keeping down this Buttercup on moist pastures. It was an early introduction but does not appear likely to become generally troublesome. It is apt to block irrigation channels or open drains.

R. arvensis, L. The Corn Ranunculus. It is a native of Europe and part of Asia, and probably introduced with corn. It is essentially a cornfield weed whose spread is favoured by slovenly cultivation and the use of impure seed, the latter ripening and being shed along with the corn. The seed, being different in size to corn, is easily separated by proper screening, sieving, and winnowing. The plant has a strong bitter taste and although very difficult to eradicate when once established, its spread has not as yet attained serious dimensions. It has no economic value. It is an erect annual with pale yellow flowers, and rather large flattened achenes bearing hooked or straight prickles.

The Meadow Crowfoot and the Bulbous Buttercup, which are troublesome weeds, do not appear to have as yet gained entrance to this State, but the Creeping and Celery-leaved Buttercups have already appeared. The acrid juice of these Buttercups also is somewhat injurious to stock when large quantities of the plants are eaten. When dry, however, as in hay, the foliage appears to be harmless.

Garden plants belonging to the Ranunculaceæ, which are poisonous, and have been known to kill or injure stock allowed to eat the clippings from gardens, are Aconite or Monkshood (*Aconitum Napellus*); Larkspur (*Delphinium*); Hellebore or Christmas Rose (*Helleborus*).

PAPAVERACEÆ (POPPY FAMILY).

Herbaceous plants with a milky sap, usually two sepals and four petals, and numerous stamens. Fruit, a capsule (Garden and Field Poppy) or long pod (Sea Poppy). A small order, almost entirely native to the north temperate zone. The seeds are small, produced usually in great abundance, and able to lie dormant in the soil in some cases for two or more years, germinating when softened or brought to the surface. A square yard of good soil will produce enough poppy seed to produce a fair crop over an acre when well spread. Hence, when once allowed to seed they are difficult to keep down. Manuring favours poppies less than it does the crop; hoeing, fallowing, and an occasional root crop also aid in keeping them under on land used for cereal grains.

Our introduced weeds include five poppies, all annuals, of which the first two, though fairly common, are not yet dangerously abundant, and the last three are still comparatively rare.

Papaver hybridum, L. The Wild, or Rough-headed Poppy. A native of Europe, Asia, and North Africa. It has large flowers with a black spot at the base of each petal, and a rounded bristly capsule.

P. Rhœas, L. The Common Red, or Field Poppy. A native of Europe, Asia, and North Africa. It has a smooth rounded capsule.

Glaucium flavum, Crantz. (*Glaucium luteum*, Scop.) A native of Europe, usually found near the seashore. It is the Sea, or Horned Poppy, and has yellow flowers and a long pod.

Argemone mexicana, L. The Prickly Poppy. It is a native of America, with spiny leaves and a five partite capsule.

A. ochroleuca, Sweet. The Yellow Poppy. It is a native of Mexico. The Prickly Poppy has spread as a weed over nearly all the warmer regions of the globe.

☞ All these plants have feeble medicinal or poisonous properties, but none of them have any pronounced economic value. The taste is usually sufficient to keep well-fed stock from them. None of the introduced poppies can as yet be classed as really serious weeds.

FUMARIACEÆ (FUMITORY FAMILY).

A small family, differing from the Poppies in the irregular flowers, and six instead of numerous stamens.

Fumaria officinalis, L. The Common Fumitory. This is a small annual with much divided leaves, the segments of which can grasp supports. It has pale pink racemes of flowers. Although found in many parts of Victoria, this cosmopolitan weed is easily kept under. It is not poisonous, has no appreciable economic value, and does not appear likely to become permanently troublesome, except in gardens. The seed appear able to lie dormant in the soil for a few years, coming up when the ground is broken up and seeded down, and often giving rise to complaints that a seedsman has sold seed of this plant instead of grass or clover seed.

ZYGOPHYLLEÆ (BEAN CAPER FAMILY).

Zygophyllum iodocarpum, F.v.M. A native of Australia; is often accused of being poisonous to stock, but the evidence is insufficient, and usually they do not touch it.

CRUCIFERÆ (CABBAGE FAMILY).

This is a very homogenous order as regards floral characteristics, all the flowers being of the Wallflower type, and white or yellow, very rarely pink to reddish-brown. Four sepals, four petals, six stamens, four long and two short. Ovary superior, forming a short or long pod.

All have a volatile pungent principle, which is especially well developed in the horse radish and mustard, and much less abundant in rape, cabbage, and turnip. The order includes both annuals and perennials, the latter being sometimes almost shrubby in character. A large number of weeds, some of them very troublesome, belong to the order, but none can be classed as poisonous, though some, like mustard and horse radish, and sometimes the common radish, act as emetics when eaten in excess.

Brassica sinapistrum, Bois. (*Sinapis arvensis*, L.). Charlock or Wild Mustard. A native of Europe. A coarse annual, one to two feet high, with a few stiff spreading hairs. Leaves rough, with very short hairs, the lower ones usually with one large oval or oblong coarsely-toothed segment, and a few smaller ones along the leafstalk. The upper ones often un-

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WILD MUSTARD.

(Brassica sinapistrum., Boiss.)

divided, oblong, or lanceolate. Flowers rather large, and yellow. Pods more or less spreading, half to one and a half inches long, of which rather more than a third is occupied by a stout beak, often containing a seed in its base; the valves glabrous, or rough with stiff reflexed hairs, the lateral nerves prominent. A native probably of Southern Europe, but now one of the most abundant weeds of cultivation throughout the world. Though an annual, this is a very troublesome weed, especially in cornfields. As in the case of all wild Cruciferæ, it has no value as a pasture plant, and even cabbage, rape, and turnip, when allowed to run wild, lose their food value and become unpalatable. It is not yet abundant, but should on no account be allowed to spread, especially on the light soils and calcareous loams which it favours.

Its suppression is possible by bare fallows, or repeated harrowing and hoeing, coupled with the cultivation of potatoes and root crops. Grain should not be grown until the land is clean, since the seed falls when the grain is harvested, and a little is sufficient to rapidly foul the land again. Two or three years treatment and careful cultivation are necessary to clean land which has been for some time badly fouled, and it is important that the deeper soil is brought to the surface, so that buried seeds may germinate.

If the weed appears unexpectedly among young corn, clover or grass, a spray of 16 lbs. of copper sulphate per 40 gallons of water per acre, or of 60 lbs. of sulphate of iron per 40 gallons of water per acre, may be used, the mixing to be done in wooden, enamelled, or greased vessels. The spraying should be as fine as possible, and should be done in dry calm weather, while the plants are young. A spray of this strength injures beans, peas, and potatoes, but not young grain crops or pastures. It does not, however, destroy wild radish, white charlock, smooth-leaved charlock, or treacle mustard, and only kills the common charlock in the seedling condition. Docks and thistles are retarded, but not destroyed, by this spray. The application of 20 to 60 or more lbs. of ammonium sulphate per 60 to 100 gallons of water per acre as a spray has been recommended to keep down charlock, while at the same time manuring the land, but the results do not seem to be altogether satisfactory, and poisoning methods are always costly and rarely satisfactory.

Proclaimed for the whole State.

Camelina sativa, Crantz. Gold of Pleasure. A native of Europe and temperate Asia. A hardy annual, but rare, and probably merely an occasional garden escape.

Capsella Bursa-pastoris, L. The Shepherd's Purse. A common European weed which has been in this State for at least sixty years, and which grows in nearly every country outside the tropical belts. It is especially found at the edges of fields, by roadsides, and on waste places, and on light cultivated land, but is not a dangerous weed, and shows no marked tendency to spread. The plant is often attacked by a white "rust" fungus, *Cystopus candidus*, which may spread on to rape, cabbages, turnips, wallflowers, or radishes. The Shepherd's Purse is an annual with small white flowers, numerous purse-like pods, and a basal rosette of simple or divided leaves. Though an annual, it often develops a long tap root in search of moisture.

Diplotaxis tenuifolia, D.C. Rocket. A native of Europe and Asia Minor. It is not plentiful, hitherto, but appears to be increasing in the Shire of South Barwon. It is a perennial frequenting chiefly walls and waste places, but may become troublesome in pastures. It has been introduced, both with ballast and with impure agricultural seed.

Erysimum repandum, L. The Treacle Mustard. A native of Europe, North Africa, and part of Asia. A larger and stouter, more branched plant, with longer beaked pods. Suppression is possible on cultivated ground by similar treatment to that of charlock, but spraying is of little or no use. The prevention of seeding and the destruction of seedlings are imperative. Older plants should be pulled up, piled and burnt before flowering. Unlike the charlock, this plant is especially dangerous as a weed on permanent pastures, spreading into pasture land and over all waste and uncultivated places.

Proclaimed for the Shire of Wimmera.

Nasturtium officinale, Scop. Water Cress. A native of Europe, Asia, and Africa introduced about sixty years ago, and common in many streams and water-courses, which it tends to choke up, especially if the bottom is muddy and the stream not too rapid. The plant has a considerable food value as a green salad, and is of especial use for correcting the effects of too meaty a diet. It is a perennial, freely rooting at the joints.

Lepidium Draba, L. Hoary Cress. A native of Europe, Asia, and Africa. This weed, like so many others, was introduced from Europe with impure agricultural seed, and also with ballast and fodder, and is especially troublesome in lucerne paddocks. It is a perennial with deeply penetrating roots, pieces of which will continue to grow. It has clusters of small whitish flowers and small short flattened pods with one seed in each cell. It is a prolific seed-bearer, and altogether is a difficult plant to eradicate. It would be a great nuisance in orchards. Summer fallowing, deep ploughing, and frequent stirring, followed by root crops, will larger suppress it, but cutting or hoeing, unless often repeated, is of little value, since the roots contain much stored food, penetrate deeply, and quickl form new shoots.

Fortunately, so far, it is not abundant outside of the places to which it has been introduced, mainly with impure seed, but it appears to be spreading.

L. sativum, L., is the garden Cress, and the native *L. ruderale*, L., is common on roadsides and waste places. *L. campestre*, Ait., the Pepper Wort, has not as yet spread to any extent, and being an annual or biennial is not so much to be dreaded as *L. Draba*.

Senebiera Coronopus, Poir., a native of Europe, Asia, and Africa, and *S. didyma*, Pers., a native of America, Swine's Cress, are introduced weeds, but are practically of no importance. The latter has been reported as poisonous to stock, but on quite false grounds, although its fodder value is slight. *S. Coronopus* has been used as a salad cress, but is of little value.

Sisymbrium officinale, Scop. Hedge Mustard. This is a native of Europe, probably introduced from Tasmania, and now fairly common and widely spread, especially in waste places and by roadsides. It is a rather small annual without any specially objectionable qualities, and though of no use and a freely seeding plant, is easily kept under. *S. Columnæ*, a large biennial plant with much longer spreading pods, has appeared around Dimboola as an introduced weed, and is likely to become troublesome if neglected.

Raphanus Raphanistrum, L. The Wild Radish or Jointed Charlock (distinguished by its jointed pod). A native of Europe, Asia, and Africa. It does not appear to be common as yet, although capable of becoming a troublesome agricultural weed, and during 1908 it was spread far and wide with imported lucerne seed. It is similar to charlock in its general

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TREACLE MUSTARD.

(Erysimum repandum, Linné)

1. A complete plant. 2. An enlarged pod.

character, and can be treated in the same way. The flowers are usually white or pale yellow. The ordinary form is annual, but a maritime form (var. *maritimum*) is found on the sea coasts, and is usually biennial, with more divided leaves, longer pods, and yellower flowers. Its fodder value is *nil*, and it becomes a troublesome weed of cultivation if once allowed to seed freely.

RESEDACEÆ (MIGNONETTE FAMILY).

Reseda Luteola, L. The Wild or Dyer's Rocket. A native of Europe and Asia. It is occasionally found, probably introduced with impure seed, but is not very injurious. The plant is an annual or biennial and easily kept under. It appears to have taken firm hold of some shires, and is apt to spread in neglected pastures.

GERANIACEÆ (GERANIUM FAMILY).

An order of herbs or low shrubs, widely distributed over the globe, with five partite flowers, and the leaves usually more or less divided.

Two of the Storksbills, *Erodium cicutarium*, L'Herit., and *E. moschatum*, L'Herit., are natives of Europe, Asia, and Africa, and are fairly common in parts. They are to a slight extent useful as low grade pasture plants, especially on dry soils. The musk *Erodium* often smells so strongly as to be quite obnoxious to stock, especially when growing near the sea. Both plants are usually annual or biennial, with a deep stout tap root.

Oxalis cernua, Thunb. The South African Wood Sorrel. It is a highly obnoxious weed, especially in gardens. It prefers slightly sour soil, and though it likes moisture, tides over drought by the aid of its underground parts. These produce bulbils freely, and since the seed is also abundant the plant is difficult to eradicate. Drainage and liming followed by manuring, and coupled with a scarifying of the surface and the encouragement of the larger pasture plants, are usually sufficient to practically suppress it on pasture land infested by it. On agricultural land clean cultivation and a season or two of root-crops, potatoes or leafy fodder crops are advisable. The plant readily spreads in again from roadsides, waste places, and the borders of fields if these are left foul. Although the leaves are nutritious and have been used as a vegetable, they are too acid to form good fodder and are usually untouched by stock.

HYPERICACEÆ (ST. JOHN'S WORT FAMILY).

A small but widely distributed order of practically no economic value, but containing one of our most troublesome weeds in certain districts. The order includes shrubs and trees as well as herbs, but the flowers are easily distinguished by the stamens being grouped in three or five bundles (or very numerous) with a central capsule more or less divided into three or five segments.

Hypericum perforatum, L. St. John's Wort. The perennial stock has deeply penetrating roots (two to over four feet) and forms short runners and erect stems one to over four feet in height in Victoria, whereas in England the stems rarely attain two feet. They are glabrous, cylindrical, or with two opposite angles. Leaves unstalked, oblong, about half an inch long, with semi-transparent dots and often a few black dots on the under side, usually the whole plant, with a bluish-green tinge. Flowers bright yellow, in terminal clusters. Sepals pointed, entire petals twice as long and with black dots, also on the anthers. Stamens numerous in three bundles, capsule opening in three valves, and with numerous small seeds.

The plant contains an oil whose medicinal value was formerly highly esteemed; but this oil, and the woody nature of the plant, render it somewhat injurious in fodder.

The St. John's Wort is a native of Europe, Asia, and Africa. It appears to have been originally a garden escape, and has spread to a remarkable extent, chiefly owing to the enormous amount of uncultivated or imperfectly cultivated land which Victoria possesses. In England, the plant though common is not listed anywhere as an agricultural weed, and in fact it stands no chance against cleanly and moderately intense cultivation. On cultivated land, deep ploughing, coupled with fallowing and root crops, will soon suppress the evil. If the plant is very thick a year's bare fallow, with one deep ploughing and two to four shallower ones, will be necessary for the preliminary cleaning. The deep ploughing cuts the roots deep down, the shallow ploughing during the dry season destroys any shoots these may form. If deep ploughing brings up much poor subsoil heavy dressings (20 to 30 tons per acre) of farmyard manure, leaves, twigs, wood chips, bark, or sawdust are needed. A potato crop in the following year gives shoots from below no chance, and a root crop may be required in the third year before the land is safe for grain. Drainage, liming, manuring and the maintenance of an open pervious soil are all factors which favour the growth of agricultural plants more than they do that of St. John's Wort, and hence are all aids to its suppression.

No poisons have any practical value in dealing with this plant; the cost is prohibitive, and the effects uncertain, while doses sufficient to produce any permanent result destroy the agricultural value of the land, temporarily at least. The same applies to the use of salt.

On forest land it does little or no harm, and if the trees are closely planted and especially if Conifers are used, the St. John's Wort is soon suppressed. The weed is most troublesome on pasture land, and since it attains several feet in height it overtops all but the largest and coarsest grasses. Such land can only be efficiently cleaned by bringing it under the plough for a time, at least. Where this is not possible, frequent mowing as often as new shoots grow up will do much to keep the plant down, but only if the new shoots are cut off before the leaves on them have attained full size. Infested land which cannot be ploughed should be planted with trees, preferably Conifers.

Since the plant is a perennial, and spreads from the roots, two or three years' treatment are required to exhaust it, while since the plant seeds freely, re-infection from neighbouring neglected land is likely to occur. If proper attention were paid to the simple modes of treatment mentioned, the weed would soon be no more troublesome than it is in England, especially if care is taken to use pure seed, free from that of weeds, in replanting cleared areas. Quite extraordinary carelessness seems to have been shown in the past as to avoiding this obvious way of spreading the pest by impure seed from infested areas.

Proclaimed for the whole State.

Hypericum Androsæmum, L. Tutsan. This is an ally of the St. John's Wort, which appears to be spreading rapidly near Apollo Bay. A little attention to the weed at the present day, by the local authorities, would avoid a possibly considerable loss in the future. Introduced; a native of Europe, and Asia Minor.

MALVACEÆ (MALLOW FAMILY).

A fairly large and widely distributed order, especially in warm regions. The flowers are easily recognised by the numerous stamens being united

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"ST JOHN'S WORT"
(*Hypericum perforatum*) Linne.

by their stalks around the ovary and styles. Some members of the order yield fibre, and many are decorative garden plants; but the order also includes a few troublesome weeds, which are difficult to get rid of, since the seed in some cases may retain its vitality for many years in the soil, and has often a cuticularized coat impermeable to moisture until scratched or broken.

Malva rotundifolia, L. The Dwarf Mallow. A native of Europe, Asia, and Africa. A common weed in waste ground and neglected gardens, as well as, sometimes, in pastures. Its deep roots enable it to stand dry conditions, and it produces seed freely. It should be pulled up, piled and burnt before seeding. If once allowed to seed freely, seedlings will continue to appear for some years. Although an annual it may last longer than one season, and the Tall Mallow (*Malva sylvestris*, L.) which is common in England but less common here, is a biennial. The Tree Mallow (*Lavatera arborea*) has a certain fodder value, and is of use for quick growing shelter hedges.

CARYOPHYLLACEÆ (PINK FAMILY).

Herbs with paired undivided leaves at each joint, usually five partite flowers and ten stamens, and a capsule opening by apical teeth. A large family, mainly of temperate regions.

This order is practically without economic value and, although it includes many decorative plants, also includes a large number of troublesome weeds, more especially of cultivated ground. All are herbs, either perennial or annual, and in the latter case, often of very short duration. The seeds are small, usually very numerous, but for the most part do not appear to retain vitality for more than two or three years at the outside. Nearly all are non-poisonous, and a few have a slight fodder value.

Silene cucubalus, Wibel, (*S. inflata*, Sm.) The Bladder Campion. A native of Europe, Asia and Africa, easily recognised by its white flower and bladderlike calyx; is a common weed in England, and was probably introduced with impure seed. It appears to be becoming a troublesome weed in the Geelong district. On cultivated land it should give no trouble, but being a perennial its suppression on permanent pastures is more difficult. If the latter are not put under temporary cultivation, the weed should be hoed up with its root, piled and burnt before flowering.

S. gallica, L. The French Campion. A native of Europe, Asia and Africa. It is a fairly tall hairy annual found in many parts of the country but does not appear to have done any great harm, and is comparatively easily suppressed. Its flowers vary in colour from white to red.

Lychnis coeli-rosa, Desr. The Rose of Heaven. A native of the Mediterranean regions, which appeared as a garden escape at Skipton prior to 1863, and at Red Jacket Creek in 1874 but does not appear to be dangerous or likely to spread.

L. Githago, Scop. The Corn Cockle. This is a native of Europe, Asia and Africa. It is a tall annual which is a great pest, especially in cornfields, but fortunately does not as yet appear to be abundant in this State. The seeds are rough and black, nearly the size of wheat grains and hence difficult to separate from them. If present, they discolour the flour, and also if in abundance make it injurious to health, since they contain a poisonous principle—Githagin. The use of pure seed, combined with good tillage and cleanly cultivation, will keep the plant down. It reached this

State with impure agricultural seed, and is spread in the same way. The seeds of the Red and White Campion (*Lychnis diurna*, Sibth., and *L. vespertina*, Sibth.)* are common impurities in corn, clover and grass seed but the Red Campion is not yet reported as a weed, although the white form is already naturalized.

Dianthus armeria, L. Reported from a few localities, usually at high elevations, but not plentiful. A native of Europe and the Caucasus.

Spergula arvensis, L. The Corn Spurrey. A native of Europe, Asia, and Africa. It is a small annual seeding freely and especially troublesome on light or strong soil, where it is apt to smother the young crop. If the seeds are abundant, a fine tilth should be prepared early in the season, and the seedlings destroyed after germination by harrowing or shallow ploughing. On pastures it has a slight temporary value as a fodder plant, but is useless for permanent pasture.

Stellaria media, Cyr. The Chickweed. A native of Europe, Asia and Africa. A prostrate watery weed with small white flowers and with a single line of hairs between each pair of leaves forming a staircase for raindrops to roll down the stem without wetting it. The plant seeds freely all the year round, and may pass through as much as six generations in one year. Assuming that each plant produced 200 seeds and all germinated, this would mean 320,000 million plants at the end of the year, and at the end of three years sufficient to form a solid mass over the whole of the world. Fortunately, though a common weed of arable land and gardens, it is easily destroyed, does not stand drought well, and its seeds soon lose their vitality in the soil.

Cerastium vulgatum, L. The Mouse-ear Chickweed. It is somewhat similar to the above in appearance, but is a coarser and more hairy plant. It is an annual or biennial, and some forms grow well in open dry situations.

Saponaria officinalis, L., Soap Wort, and *S. vaccaria*, L., Cow Soap Wort, are European weeds which appear to be sporadically introduced from time to time with impure seed, but do not appear as yet to have fully established themselves or to have spread to any extent.

DROSERACEÆ (SUNDEW FAMILY).

A small order easily recognised by the glandular leaves which enable the plants to capture and digest insects. Various species of *Drosera* are occasionally sent in as supposed poisonous plants. Possibly the fact that they trap and digest small insects suggests to the popular mind that they may also be dangerous to cows and sheep. One species of the genus, *D. communis*, St. Hil., from Brazil is very bitter and is supposed to be injurious to sheep, but it does not grow in Australia, and no poisonous principle has hitherto been extracted from any member of this genus. Putrid insects adhering to a leaf might cause ptomaine poisoning when the leaf was eaten, but this is not very likely.

Calycifloreæ.

The top of the flower stalk (thalamus) is more or less prolonged into a cup or saucer-like enlargement from whose inner and upper edge, sepals and petals or sepals, petals and stamens arise. In the simpler forms, the calyx segments appear to be merely somewhat fused at the base.

* These species are sometimes made varieties of one species—*Lychnis dioica*, L. var. *rubra* and var. *alba*.

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ACACIA HEDGE.

(Acacia armata. Rob. Brown.)

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CAPE BROOM.

(Cytisus canariensis, Steudel.)

LEGUMINOSÆ (PEA FAMILY).

A very large and widely spread order, including a few troublesome or even poisonous weeds, but also including a very large number of useful food and fodder plants (Beans, Vetches, Clovers, Trefoils, Melilots, &c.) and many useful trees or shrubs (Acacia, &c.) It is spread over the whole globe, and is represented in temperate regions mainly by herbs, in warmer regions mainly by shrubs, and in the tropics mainly by trees. All the plants of this order have tubercles on their roots which contain bacteria, by whose aid the plants are able to fix atmospheric nitrogen, and so ultimately enrich the soil with this constituent of plant food. The seeds in many cases retain their vitality for a very long time, over 30 to 50 years in the case of various species of *Melilotus*, *Trifolium*, *Cytisus*, *Medicago*, *Goodia*, *Hovea*, *Acacia*, &c., and seed of the latter three may retain their vitality for more than 100 years. Hence, it is of great importance, where a leguminous weed is to be kept under, to suppress it before the ground is charged with seed, and after clearing to keep the ground well covered by other vegetation. The flowers are either small and in heads (*Acacia*), or larger and each distinct. (*Papilionaceæ*. Pea and Bean.) In the Pea type there are five sepals, five petals, ten stamens, and one carpel. The latter forms the pod-like fruit (legume) characteristic of the whole order.

Acacia armata, R.Br., Acacia Hedge. A bushy shrub, with angular, striate (grooved) branches. The flattened leaf stalks resemble leaves (phyllodes), and are semi-ovate, oblong, often wavy, with a central midrib, about one inch long. Stipules spiny, four to five lines long. Flower-stalks as long as the phyllodes, bearing globular heads. Pod one and a half to two inches long, two or three lines broad. Seeds oblong, the funicle (stalk) forming three or four folds.

This native plant has frequently been used for hedges, but the readiness with which it spreads, and its highly objectionable character, make it a dangerous plant to use for this purpose.

The plants should be dug up before flowering has taken place, piled, and burnt. Fairly frequent mowing will prevent the plant establishing itself on pastures, although it will usually shoot again from the stump if this is an appreciable size. On cultivated ground the seedlings are destroyed without any special treatment being necessary. Although of practically no economic value, the plant is not actively poisonous, nor in fact is any Acacia so far as is known, although the Leguminosæ include several undoubtedly poisonous plants.

Proclaimed for the Shires of Dundas, Frankston and Hastings, Hamilton, Maldon, Mornington, and Portland, and the Borough of Portland.

Cytisus canariensis, Steudel. The Cape Broom. A hardy evergreen shrub, four to ten feet high. Branches angular; leaves, with three leaflets, and, as well as the branches, clothed with soft hair or down, leaflets obovate-oblong. Heads of flowers, terminal, yellow, pod clothed with white hair. A native of the Canary Islands.

This perennial introduced shrub seeds freely, and proves a great nuisance on pasture land or on neglected arable land, if allowed to spread. It is sometimes used as a hedge plant, and then only becomes dangerous when the hedge is not kept clean, trim and well cut. Being a leguminous plant, it enriches the soil with nitrogen, and since its roots, like those of gorse, penetrate deeply, it stands drought fairly well. Although rather loose when allowed to grow freely, it becomes dense and compact if closely and frequently cut, and forms a good wind-break. The plant has been

proclaimed for the following districts at the request of the Shire Councils concerned:—Bungaree, Creswick, Glenlyon, Heidelberg, Kyneton, Kilmore, Lexton, Lilydale, Maldon, Malmsbury, Springfield, and Templestowe.

In the same way *C. scoparius*, Link., the English Broom, has been proclaimed for the Shires of Glenlyon and Maldon.

C. scoparius, Link., is a shrub of two to six feet in height, nearly glabrous, but the younger branchlets and leaves silky, with numerous long, straight and erect, green, wiry branches prominently angled. Lower leaves shortly stalked, with three small, obovate leaflets; upper leaves sessile, or shortly stalked, the leaflets often reduced to a single one. Flowers large, bright yellow, solitary or in pairs, on slender pedicels, in the axils of the old leaves, forming handsome leafy racemes along the upper branches. Petals all broad, the standard broadly orbicular, the keel deflected. Pod one and a half to two inches long, flat, brown, or black, hairy on the edges, but glabrous on the sides, the seeds attached to a line considerably within the edges of the pod. Though termed English Broom, it is a native of Europe, Northern Asia, the Canaries and Azores. ☞ The foliage of both species of Broom appears to be feebly poisonous. The plant must be dug out, piled, and burnt before seeding. Seedlings can be kept down by hoeing or mowing, but in the latter case must be cut close to the ground. It takes some years to exhaust all the seed in the soil, but the plant is easily kept down by ordinary cultivation. On waste ground of no value for pasturage, and which cannot be ploughed or cultivated with success, a close planting of trees should be made, and these will ultimately suppress the shrub.

☞ *Gastrolobium*, or Poison bush, is one of the few suspected poison plants from which an undoubted poisonous principle has been extracted. Fortunately, the genus is not native to Victoria, and does not as yet appear to have been introduced to the State, although among the most serious poison plants of Western Australia.

Goodia lotifolia, Salisb. (*Goodia medicaginea*, F. v. M.). It is a shrub with yellow flowers, known as the "clover tree" on account of its trifoliate leaves. It is native, and is often reported as poisonous, but on unsatisfactory evidence. Under ordinary circumstances, it is a useful fodder plant on unimproved pastures.

Indigofera australis, Willd. The true Native Wild Indigo. It is often reported to have caused the death of cattle and sheep feeding upon it, but no poisonous principle has been extracted, and the genus as a whole is non-poisonous although some species are supposed to have vermifuge or medicinal properties.

☞ *Lathyrus sativus*, L. Gesse Pea or Indian Vetchling. Although this Indian plant has not yet reached Victoria, it has appeared in England through the importation of impure seed, and has caused considerable damage to stock at times. When eaten repeatedly, it causes in horses a peculiar affection of the larynx leading to roaring and ultimate asphyxiation. This is a special symptom in horses, the general symptom for all animals affected by the accumulative poisoning or "lathyrism," resulting from a continued diet of the plant is a paralysis of the hinder extremities, due to fatty degeneration of the muscle fibres. The poison is a volatile alkaloid, which is driven off by heat, rendering the pulse innocuous. Neglect of this simple precaution has caused the inhabitants of whole villages in India to become struck with more or less complete paralysis.

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ENGLISH BROOM.

(Cytisus scoparius, Link.)

The plant can be recognised by its oblong winged pods, paired leaflets with a long tendril, solitary flowers, and annual habit. Neither the annual nor the everlasting vetchlings are really good fodder plants as compared with peas, vetches, lucerne, and clover. *Lathyrus aphaca*, L., is another field weed in India. It is without leaflets and with seeds which are narcotic when ripe.

Lotus australis, Andr., and *L. corniculatus*, L. The native and the introduced Bird's-foot Trefoils. These were considered by Mueller (*Trans. Roy. Soc., Vict.*, Vol. VI., p. 148) to be intensely poisonous. They are both, however, useful pasture plants, quite harmless, some varieties adapted to dry, others to moist ground. Sheep, when allowed to gorge themselves on a luxuriant crop, may suffer in precisely the same way as in the case of all succulent herbage.

☞ *Lupinus albus*, L. The White Lupin. This plant and also the yellow and blue lupins, are very valuable for green manuring and have rendered possible the reclamation of large tracts of sandy soil in Germany. Their bitter taste, however, makes them unpalatable to horses and cattle, and it appears that when fed off to sheep before ploughing in, frequently they give rise to heavy mortality. This is ascribed to the presence of a poisonous alkaloid, "lupinotoxine," occurring both in the fodder and grain. It can be destroyed by steaming. It is not always present, but the conditions which cause its appearance are not known.

Medicago denticulata, Willd. The Burr "Clover." A native of Europe, Asia and Africa. This plant is of some value as a fodder plant on waste ground and on dry hillsides, especially when young, but when older has a straggling character, yields but little nutritious foliage and is objectionable on account of its twisted spiny pods which adhere to the wool of sheep. This introduced plant is a common weed of pastures and waste places, and is sometimes troublesome in gardens. The seed may retain their vitality for many years, and the plant seeds freely and rapidly. Hence, it is difficult to suppress, except by the aid of cultivation and of other vegetation, when once established.

☞ *Melilotus*. Melilot. All the species contain Cumarin, a volatile odoriferous principle, which in excess produces a disinclination to locomotion, paralysis and ultimately fatal symptoms. No harm is to be apprehended if the amount present does not exceed 10 per cent. of the herbage, and the aroma of Cumarin, which is also present in the grass *Anthoxanthum odoratum*, renders stale hay more palatable. The seed of some species may last for 50 years.

The Melilot, which comes most closely under the head of a weed is the so-called King Island Melilot, *Melilotus parviflora*, which though of some use as a humus former on poor soils and for green manuring, is not a good grazing plant and is an unmitigated weed on good land, especially among corn.

Swainsona. This genus of herbaceous or shrubby plants is commonly regarded as being a dangerously poisonous one to all kinds of stock. There can be no doubt, however, that most species are quite harmless or even useful pasture plants, especially when mixed with other herbage.

The two species most suspected are the Darling Pea, ☞ *Swainsona galegifolia*, R. Br., and *Swainsona Greyana*, Lindley, sometimes known as the Poison Bush, both native to Australia. The latter was regarded as deadly poisonous by Mueller, and it is interesting to notice that most of the supposed cases of poisoning occur in the dry season when stock are especially attracted by green and succulent foliage, and are more likely to gorge themselves upon a single such plant if found in fair abundance. Further,

when a plant is poisonous, the poisonous principle is usually more concentrated in the seed than elsewhere (*Strychnos, Sophora, Physostigma*) so that the foliage of feebly poisonous plants, especially in mixed fodder, may be eaten without danger, provided an excess is not taken (*Cytisus, Swainsona, Crotalaria, Gastrolobium*). In still other cases, *Melilotus, Euphorbia Drummondii*, &c., pronounced injurious effects are only experienced on an almost exclusive diet of the plant in question; and if care is taken to avoid that or to give change of food no special danger is to be apprehended. Further, the poison may be volatile, as in *Pangium edule* and the Laurel, or may be destroyed by drying, as in buttercups, so that the herbage when dry or steamed may be harmless. This whole subject affords another argument against unlimited free grazing, and in favour of the penning and resting methods of pasturage and the fodder, silage and root-crop modes of feeding stock. This prevents the stock acquiring a predilection for, and seeking out exclusively, herbage which may be injurious to them when eaten in excess (indigo eaters, "locoed" stock, &c.).

Professor Martin has closely investigated the action of *Swainsona galegifolia* on sheep and finds that its effects are similar to those produced by slow poisoning with alcohol and certain toxic proteids, peripheral neuritis and degeneration of the nerve endings accompanied by a loss of muscular control resulting. The action is a slow one, four to six weeks being required to produce serious symptoms. If at once returned to proper fodder, recovery will take place, but not when paralytic symptoms have supervened. Young lambs probably respond more rapidly to the poison; and when the symptoms are fully established there is no remedy. A practical precaution is, however, to keep the sheep penned in paddocks wherever Darling Pea is found, and to see that they do not remain in any paddock where the plant is growing for longer than three or four weeks. Apart from its poisonous action the plant is a nutritious one, so that in this way it can be kept down and its food value utilized without permanent danger. It is evident that the less of the Darling Pea eaten in a given time, the longer the poisonous action will be delayed, but what proportion would be permanently innocuous is unknown. Probably a proportion of 5 to 10 per cent. would be harmless. In any case, supplementing the grazing with some artificial food (fodder, silage, roots, chaff, &c.), would lessen the danger while the sheep were in an infested paddock. Plants accused in America of producing similar results to *Swainsona* are *Astragalus mollissimus*, Torr.; *A. lentiginesus*, Doug.; *A. Hornii*, A. Gray; *Crotalaria sagittalis*, L.; *Oxytropis Lamberti*, Pursh. The genus *Sophora* also appears to include several poisonous species. *Templetonia egena*, Benth., appears to have poisonous properties, but no exact investigations have been carried out.

Trifolium angustifolium, L., the Spring Clover, and *Trifolium arvense*, L., the Hare's-foot Clover, are among the few true clovers that are weeds of no value. Both are introduced plants, natives of Europe, Asia and Africa, but neither appears to be very common.

The Crimson Clover (*Trifolium incarnatum*, L.) is a native of Southern Europe. Though often grown as a catch crop in rotation farming in the south of England, it is a very dangerous plant for permanent pastures. When fully grown the plant develops hairs on its flowers, which often ball together in the stomachs of stock, and may cause death. If cut as soon as flowering begins, the plant may be used directly or in the form of silage and then yields good feed.

Ulex europæus, L. Furze or Gorse. A shrub of two to three feet, or even twice that height when old and luxuriant, more or less hairy,

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FURZE.

(Ulex Europaeus. Linne.)

especially on the main branches; the numerous short, intricate, small branches all ending in a stout thorn. Lower leaves occasionally lance-shaped, but the greater number reduced to thorns, up to an inch in length or more. Flowers fairly large, solitary, in the axils of the leaves on the preceding year's shoots, forming showy racemes, intermixed with thorns at the end of the branches. Calyx, yellow like the petals and but little shorter, clothed with brownish hairs, with a small broad bract a millimetre or two in length on each side at the base, besides a similar bract under the short pedicel. Petals narrow. A native of Europe and Africa.

This prickly perennial evergreen shrub with deeply descending roots is an introduction from Europe used as a hedge plant in certain districts, having apparently been introduced for that purpose. Baron von Mueller records scattering seed in several districts and considered that the plant was useful for binding drift sand on the coasts, for which, however, it is by no means to be recommended. It is hardly a saline plant although it flourishes on sandy soil. It is, however, of comparatively little value for arresting drift sand, although on coarser material it will grow when exposed to strong winds even near the sea, and then assumes a very short condensed compact habit. If closely trimmed it flowers and seeds but little or not at all, though if neglected it soon spreads and becomes a troublesome weed of pasture land. In several semi-suburban localities the plant has been entirely eradicated by the rigid application of the Thistle Act. For eradication the plant must be dug up before flowering, piled and burnt. If burnt off while rooted, it usually shoots up again. Cultivation, hoeing or mowing are necessary to keep down seedlings which may continue to come up for three years or more.

Cows will browse on the young shoots while they are still tender, and in some parts of Europe, especially in Western France, the branches are crushed and used as fodder. They contain, however, too much woody fibre to make good food as compared with ordinary fodder, and when dry and chopped form good kindling wood.

After being proclaimed for no less than fifty-three districts from all parts of Victoria, at the request of the different shire councils concerned, including many in which it is in common use as a hedge plant, it was proclaimed for the whole State in 1908.

Vicia.—Several Vetches or Tares have been introduced all of which are more or less useful as fodder plants, though often becoming weeds on cultivated ground. Thus the Common Tare (*Vicia sativa*, L.) is often very troublesome among crops grown for grain, not only diminishing the yield, but making clean harvesting difficult.

HEDGE PLANTS UNDER THE THISTLE ACT.

The Furze forms hedges in many parts, even in shires for which it is proclaimed, and the same applies to the proclaimed Acacia Hedge or Prickly Acacia (*Acacia armata*). Indeed, so long as the hedges are kept properly trimmed, there is no danger.

The Thistle Act requires complete eradication which is not necessary and is not carried out in practice. An amendment might be made to the effect that the following proclaimed plants:—*Rosa rubiginosa*, L., Sweet Briar; *Rubus fruticosus*, L., Black Berry Bramble; *Ulex europæus*, L., Furze or Gorse; *Acacia armata*, R.Br., Acacia Hedge; *Lycium horridum*, Thunb., African Box Thorn; *Cytisus scoparius*, Link., English Broom; and *Cytisus canariensis*, Steud., Cape Broom, may be allowed, on the

request of any Shire Council concerned, to grow in hedges as hedge plants provided that the said hedges are kept closely trimmed and not allowed to exceed a breadth of three feet and a height of six feet. If this provision were adhered to, there would be no appreciable danger of the plants spreading in pest fashion, and at the same time the theory of the Act would be brought into closer harmony with its practical application. In some districts, however, the Sweet Briar, Bramble, and Box Thorn have so strong a hold and are proving so troublesome that it is doubtful whether it would be wise to relax the Act in any way in regard to them for the present at least. Box Thorn, for instance, though a useful hedge plant, especially when mixed with Tree Lucerne, is only safe in closely settled districts where it can be kept under control. To introduce it in sparsely settled districts is wanton folly. It spreads rapidly, grows on almost any soil, forms impenetrable thickets harvouring vermin, stands drought and cannot be burnt. To cut it is costly and dangerous on account of the thorns which are slightly poisonous, and when cut the stumps and roots will shoot again. Once covered by it, grazing land becomes practically worthless, since it will only pay to completely eradicate it when the land is to be used for intense cultivation.

ROSACEÆ (ROSE FAMILY).

The typical rosaceous flower with its indefinite stamens inserted on the "calyx" cup is easily recognised, but a few members of the family have small greenish flowers in clusters, no petals, and a few stamens only. This large order includes, in addition to many decorative plants and a number of valuable orchard trees (Cherry, Apple, Medlar, Pear, Plum, Almond, Quince), a few troublesome weeds or at least plants which become troublesome on neglected ground. The order is, however, essentially not a "weed" order, and throughout its members the seed appears to be short lived, except possibly in the case of such plants as the Hawthorn. Two rosaceous plants are proclaimed.

Rosa rubiginosa, L. The Sweet Briar. A tall often dense shrub, branches erect or arching, with large hooked prickles flattened laterally, and smaller, straighter ones interspersed with glandular hairs. Leaflets five to seven, roundish or egg-shaped, doubly toothed, glabrous above, hairy, clothed with rust coloured glands beneath, from which when bruised is emitted the peculiar sweet-briar odour, for which the plant is noted. Flowers one to three together, concave, pink. Sepals pinnate and bristly. Fruit orange-red, roundish or ovoid.

This plant has no edible fruit like the Blackberry to plead in excuse for its existence, but simply its aroma. Birds eat the red fruits, scattering the undigested seeds far and wide. It is a still more troublesome weed to subdue than the Bramble, but the same directions for eradication apply in this case also. Its spread is favoured by archaic methods of pasturage, without cultivating, renewing or resting the pastures. Stock will eat the young new shoots formed after cutting down if close penned on the ground, but when the shoots are older they remain untouched, and soon replenish the food stored in the root-stock. Hence, cutting, to be effective, should be repeated as often as any hard stems are formed. With the aid of a twisted chain and a strong horse or pair of horses, old plants can be dragged out of the ground especially after rain, piled and burnt when dry. Digging out with a spade or mattock is cleaner since the portions of the root-stock are more likely to be removed, but this means a heavy labour

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SWEET BRIAR.

(*Rosa rubiginosa*, Linné.)

BLACKBERRY BRAMBLE

(Rubus fruticosus, Linné)

charge. After being proclaimed piecemeal for 69 shires during the period since the issue of the Thistle pamphlet (1893) as it reached each shire, it has been proclaimed for the whole State (1908).

Rubus fruticosus, L. The Blackberry Bramble. The struggling stems arise from a perennial root-stock, without underground creeping shoots; the flowering stem, biennial, or of a few years duration, sometimes nearly erect, but more frequently arched, straggling or prostrate, often rooting, and forming fresh plants at the extremity, usually armed with prickles, either stout and hooked or thin and straight, with stiff hairs, or glandular bristles, or a short down, all variously intermingled or occasionally wanting. Stipules awl-shaped, or linear, inserted a short way up the leaf stalk. Leaflets rather large and coarse, either three or five, the two or four lower ones inserted together at some distance below the terminal one, egg-shaped toothed, more or less downy, the midribs as well as the stalks usually armed with small hooked prickles. Flowers white or pink in panicles at the ends of the branches. Fruit black, or very rarely dull red, not separating readily from the receptacle, the calyx usually turned down under it, or seldom closing over it.

It is an introduced plant from Europe and Asia now widely spread on roadsides, in thickets, hedges, and on uncultivated pasture land, neglected fields or waste places. After it has been mown down, it can easily be kept under by cultivation wherever the plough can reach. If near to gardens, it should be dug out root and branch, piled and burnt before flowering, since the plant shoots from below when the stems are cut down above. On pasture land frequent cutting soon weakens it, if the new shoots are removed before the leaves have time to feed to any extent; and four cuttings in one year are much more valuable than the same number spread over two years. On rocky or hilly ground of insufficient value to make direct eradication profitable, suitable trees should be closely planted. Two cuttings a year will keep it down and prevent flowering and fruiting, stopping further spread without entirely suppressing it. The tender young shoots could be used as fodder in silage or after steaming, but would hardly be worth while collecting. They have even been used as food for man. The fruits can be used for jam or for making blackberry wine.

Proclaimed for the whole State after being separately proclaimed for 32 shires at the request of the shire councils concerned.

Acæna. Sheep's Burr. Two species of *Acæna* (*A. Sanguisorba*, Vahl., *A. ovina*, A. Cunn.) are great nuisances in pastures on account of their little heads of fruits, each fruit with four or five little hooks curved at the end. The plant has a slight fodder value when young and the same applies to the greater Burnet (*Sanguisorba officinalis*, L.) and the Salad Burnet (*Poterium Sanguisorba*, L.) which are similar in character but whose fruits have no adherent hooks. The former does best in rather damp meadows, the latter on dry soils especially if calcareous, *i.e.*, on soil where good pasture plants do not do well. When old, these plants become hard and woody at the base and sufficiently unpalatable to be rejected by stock unless hungry. All three plants have more or less closely paired leaflets on long stalks, and small flowers in stalked heads, red in the Greater Burnet, more greenish in the Salad Burnet.

The seeds of burnet are often found in pasture mixtures, and such seed should be rejected if the pasture is a good one, neither too wet or too dry.

CACTACEÆ (CACTUS FAMILY).

Plants with fleshy prickly stems and usually rather large flowers with numerous stamens. Several species of cactus have proved a great pest in New South Wales and Queensland, but in Victoria only one species seems to gain any foothold, and though not as yet abundant anywhere has been wisely proclaimed for the whole State. The plants of this order are readily spread by seeds carried by birds and animals which eat the edible fruits, and in addition any joint is able to strike root and start a new plant, and may remain alive some weeks after being cut off the parent plant.

Opuntia monacantha, Haw. Prickly Pear or Cactus. A native of South America, which according to Mr. Maiden was wrongly named *O. Dillenii*, Haw., by Baron von Mueller, occurs locally in several places, and is likely to spread in hot, dry, sheltered places. It does not stand severe frost, but when once established is exceedingly difficult to eradicate. It needs to be dug up, and either buried deeply or piled in dense heaps, covered thickly with quicklime or sprayed with arsenite of soda or dilute sulphuric acid (1 lb. concentrated acid per cwt. of plants). If plenty of brushwood is available, the plants can be broiled or boiled, and so killed. After boiling, the stems can be used as fodder, but if many of the small spines adhere, the animals are likely to suffer internal irritation or inflammation, and in any case the material has only a low fodder value. It has often been stated that the plant is likely to prove a boon to pastoralists, but such statements can only have emanated from an ignorant or prejudiced person, and they are contrary to the experience of all countries where the plant is abundant.

To burn off the spines by means of a torch from as many plants as the stock can eat in a day, as has been recommended, is very difficult to do properly, and would be costly without cheap native labour. It would merely provide a watery and at the same time fibrous and therefore dangerous fodder at considerable cost. To propagate spineless cacti in the hope of their suppressing the spiny form is merely wasted labour.

The name *monacantha* is misleading, since the spines are often paired.

LORANTHACEÆ (MISTLETOE FAMILY).

A small order of parasitic shrubs spread over the whole globe, many being serious forestral pests in Australia and elsewhere.

Loranthus celastroides, Sieber. The Mistletoe. A parasitic glabrous shrub, usually on our native trees. Leaves opposite, from a rounded egg shape to a narrow lance shape, and, when narrow, often sickle-shaped; thick in structure. Flowers in loose cymes, usually terminal; petals elongated, five or six, free, often yellowish or somewhat reddish, soon spreading or reflexed; loosely hung anthers. Fruit almost pear-shaped, yellowish green. The Mistletoe is a native of Australia. This parasite spreads over the trees, and eventually destroys them. It grows mainly on Eucalypts, but on others also. The best method of eradication is to have the infested branches entirely removed and burned, as well as any young branches on which seedlings may have established themselves.

Proclaimed under the Thistle Act for the whole State—October, 1904.

Loranthus pendulus, Sieber. The Hanging Mistletoe. A glabrous shrub parasitic on the branches of trees. Leaves mostly opposite, egg-shaped, or elongated, and of nearly equal breadth near base and apex; from two inches to ten inches long, and sometimes even longer, seldom assuming a

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DROOPING PRICKLY PEAR.

(*Opuntia monacantha*, *Haw.*)

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MISTLETOE.

(Loranthus celastroides, Sieber.)

O. Wauer, Del. J. R. Tovey, Direxit.

HANGING MISTLETOE.

(Loranthus pendulus, Sieber.)

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HEMLOCK.

(Conium maculatum, L.)

heart-shaped form. Flowers in axillary cymes; petals, usually five, elongated, soon spreading or bent back. Anthers adnate. Fruit brownish green, quite viscid (sticky); distinctly contracted at the summit. The Hanging Mistletoe is a native of Australia. Like the preceding one, this parasite is very destructive. Both, if not checked, spread over the trees and kill them, thus causing great loss in our timber resources. It is especially common on Eucalpyts, but also grows on Acacias and other trees. Birds are mainly responsible for the conveyance of seeds from infested to healthy trees. The infested branches should be cut off and burned.

Proclaimed under the Thistle Act for the whole State—October, 1904.

UMBELLIFERÆ (CARROT FAMILY).

A large order easily recognised by the rayed groups of flowers, usually white, and leaving stalked clusters of seed like fruits, each splitting into two when ripe. It contains several plants of economic value, carrot, parsnip, celery, parsley, earthnut, or pignut, &c. These, for the most part, readily run wild when neglected, and the wild form of the cultivated carrot (*Daucus carota*, L.) often becomes troublesome in neglected fields. Its root then becomes hard and tough, but the leaves retain a certain fodder value, and are readily eaten by stock. Similarly, the Fennel (*Fœniculum vulgare*, Gærtn.) is a common garden escape in many parts, often very luxuriant in neglected gardens, fields, and waste places. The root-stock is, however, usually of short duration, and the seed are short-lived. Hence, cultivation or the prevention of seeding soon suppresses the plant. The plant is a tall one, and can be recognised by its aromatic smell, its yellow flowers, and the absence of any bracts at the bases of the flower clusters.

☞ *Conium maculatum*, L. The Hemlock. A native of Europe and Asia. It is a poisonous plant, whose leaves emit a peculiar mouse-like smell when rubbed. The Fool's Parsley (*Æthusa cynapium*, L.) has a similar disagreeable smell, but it is a smaller annual plant, a foot or two high, with bright green leaves, and the bracts beneath the flower clusters bent downwards, which is unusual in Umbelliferæ. In the Hemlock, there are also usually three bracts beneath each flower cluster, but they are turned towards the outside of the cluster, and not bent downwards. It is an erect annual or biennial often over five feet high, with large, much divided leaves, and ten to fifteen rayed compound terminal umbels, each main umbel with a variable number of green bracts at its base. The fruit (*b*) and (*c*) is flattened, and with five ribs on each side.

EXPLANATION OF PLATE (HEMLOCK).

(*a*) Secondary umbel in fruit.
(*b*) Fruit from side shewing ribs.
(*c*) Half of fruit in transverse section.

The Hemlock is a common garden escape, found in waste places and fields in several parts, and it has been widely grown in gardens as the carrot or parsley fern. It recently was responsible for the poisoning of a number of cows at Warrnambool, and also for the death of a child at Clunes. Fortunately, its smell usually repels stock and children, but the plant is highly poisonous, owing to the presence of the poisonous alkaloid —coniin, most abundant in the seeds, but also present in the leaves and stem. Goats appear to be largely immune to the action of the poison. Fool's Parsley is less poisonous, but still dangerous when present among fodder. Being an annual, it is easily suppressed by preventing the formation of seeds, by cutting, hoeing, or cultivation. The same applies to the Hemlock, although its eradication is more difficult, since it may last for two years.

On waste ground it is best pulled up, piled, and burnt, and the ground if possible kept covered with other vegetation to prevent its re-establishment by seedlings. On cultivated ground it gives no trouble, though apt to spread along hedges, the borders of fields, the banks of streams, &c. Here cutting it down is sufficient, and the seed in the soil, being short-lived, are soon exhausted.

Proclaimed for the whole State—May, 1907.

☞ *Trachymene australis*, Benth. The native Wild Parsnip. This is commonly supposed to be poisonous, but no exact investigations have been made. Flowers regular, bell-shaped, usually blue, ovary inferior, stamens five. Petals more or less united from the base upwards to form a corolla.

GAMOPETALÆ.

CAMPANULACEÆ (BLUE BELL FAMILY).

A small herbaceous order distributed over nearly the whole of the globe, containing many decorative plants and a few weeds, but no reported poisonous plants outside those which have come under suspicion in Australia. A large number of the members of the order yield food products (leaves and roots in various parts of the world, especially Asia and Africa), and although some have a certain medicinal value no definitely poisonous principle has as yet been shown to be present normally in any member of this order.

☞ The sub-order Lobeliaceæ, however, is characterized by the presence of a sharp burning or even narcotic milky sap, large doses of which are poisonous, although small amounts have a certain tonic or stimulating action. The following Australian species have been recorded as poisonous to stock:—*Isotoma axillaris*, Lindley; *I. Brownii*, Don; *Pratia erecta*, Gaud. (*Lobelia pratioides*, Benth.), but no exact investigations have been made upon their action, and upon the limit of safety in time and quantity. The Lobeliaceæ differ from the Campanulaceæ in the corolla being split on one side, and in the anthers cohering together. The genus *Isotoma* appears to be the most poisonous one of the order.

Thus the *Isotoma longiflora*, Presl., of South America, is peculiarly deadly to horses, and the *Isotoma axillaris*, Lindley, of Victoria, though less poisonous, has also been known to kill or seriously affect stock. The action is due to the principles contained in the acrid, burning or even narcotic milky sap, which in large doses taken internally produces inflammation of the alimentary canal, and ultimately death; in smaller doses usually induces strong purging, and in minute doses merely acts as a tonic stimulant.

The plant should be hoed up, or pulled up after rain before seeding, and stock kept from land where it is abundant, especially if other food is scarce. The unpleasant taste usually keeps stock from it unless they are hungry, or have abnormal appetites.

Lobelia concolor, R. Br. (*Pratia erecta*, Gaud.), a native of Australia. It is a small perennial with prostrate or erect stems bearing bluish axillary flowers usually paler on the inner side, and unstalked oblong or oval leaves with toothed edges. The plant is very generally reported as being poisonous, and according to some, one of the symptoms of poisoning is a paralysis of the hind quarters. No definite poisonous principle appears to have been extracted and no remedy is known. Prevention is the best remedy, and the plant is usually eaten only when stock are starving or when they reach new ground after travelling.

Since the plant is a perennial, the root-stock must be hoed up, allowed to dry, and burnt. This is best done when the plant begins to flower since it is then most easily distinguished, but if left too late the seed will re-establish it next year. As in the case of many weeds, merely scarifying and loosening the soil of the pasture, coupled with the application of light top-dressings of well rotted farmyard manure, so strengthens the grasses and pasture plants that the weeds are well kept under. Ordinary cultivation rapidly suppresses the weed, and on pastures, clovers, medicks and trefoils help to keep it down, but it appears to be increasing rapidly in many parts of Victoria under the present grazing conditions. Other native species of *Isotoma* and *Lobelia* are supposed to be poisonous, but the evidence is unsatisfactory, and will be so until the new Veterinary Institute is in a position to carry out the required investigations.

CUCURBITACEÆ (CUCUMBER FAMILY).

An order of herbs easily known by the separate male and female flowers, and by the berry-like fruits.

Cucumis myriocarpus, Naudin. A native of Africa. A small cucumber with round fruits, stated tc be occasionally eaten by horses, when delirium and partial blindness result (1899, Wimmera District). The evidence is, however, quite unsatisfactory. The plant has spread principally along the Upper Murray, and is said to be eaten by cattle, when the grazing is poor, without ill effects. It is known as the Gooseberry Cucumber.

RUBIACEÆ (MADDER FAMILY).

This order is represented among the Victorian weeds only by the sub-group Stellatæ, known by their small white or yellow star-like flowers, with practically no calyx; four or five petals and stamens, and inferior ovary of two carpels.

Sherardia arvensis, L. The Field Madder. A native of Europe and temperate Asia. Is a small annual, not very plentiful, and not likely to be troublesome. Introduced with foreign seed.

Galium Aparine, L. The Goose grass, Cleavers, or Robin-run-over-the-Hedge. A native of Europe, Asia, and Africa. It is much more obnoxious, and has probably reached this State in impure seed, and with fodder. It is an annual, with weak, straggling stems, climbing by means of the roughened edges, bearing rings of six to eight leaves, with clusters of two, three, or more of small white flowers, forming paired burr-like prickly fruits, each half of the fruit with one seed.

The plant is a troublesome weed in corn crops on light soils, and also in gardens. The preparation of a fine tilth encourages seed in the soil to germinate, and then harrowing, discing, or shallow ploughing destroys the seedlings. Special care should be taken to avoid the use of impure seed, or of manure containing the seeds of the plant. Although the seeds do not appear to have a very prolonged vitality, they are able to resist the action of fermenting manure for some months without losing the power of germination. The same applies to all seed with hard coats (Clover, Melilotus, Medicago, Acacia, Goodia, Malva, &c.). Passage through the stomach of an animal usually favours the germination of such seeds, as well as of the seeds enclosed in berry-like or stone fruits (Rose, Apple, Blackberry, Grape, Currant). Goose grass is eaten by stock when hungry, but, though not poisonous, is apt to cause internal irritation, and has a certain diuretic action.

COMPOSITÆ (DAISY FAMILY).

Flowers small (florets), in heads like single flowers, with ray and disc florets (daisy), or with disc florets only (thistle), or with "ray" florets only (hawkweed).

Compositæ form the largest natural order of flowering plants, and although the order includes a few plants of economic value, our most troublesome weeds also belong to it. The plants are annual or perennial herbs, occasionally shrubby, and one gigantic Groundsel (*Senecio Johnstoni*, Oliver) attains the dimensions of a tree in Africa. Fortunately the seed of the whole order appear to be short-lived, none so far as is known lasting for more than ten years, and most losing the power of germination within one to three years in the soil.

Anthemis Cotula, L. The Stinking Mayweed or Fetid Chamomile. A native of Europe, Asia, and Africa. It is common on roadsides, waste places, and if allowed to seed freely is apt to spread into pastures and cornfields, and become troublesome. It is especially abundant along many stock roads, where travelling stock continually eat off the pasture plants, and so give them no chance to keep down the Mayweed. The plant is obnoxious to stock on account of its unpleasant flavour, and if eaten by them in time of scarcity is apt to give their flesh, milk, or butter an unpleasant flavour.

The plant is an annual, a foot or more in height, with glandular dots, and with one or more daisy-like heads on long, furrowed stalks, but dwarfed on dry, exposed roadsides and waste places. The leaves are much divided, especially the lower ones. There are a few linear-pointed scales between the minute flowers on each head, and the latter lengthens out during flowering. Ray florets, white, and with no style, inner bracts of the head with scaly tips, seed-like fruits, rough, with glandular dots. It seeds freely, but is easily kept under by ploughing and cleanly cultivation, encouraging the seeds to germinate, and then destroying the seedlings by working the soil. The stouter pasture grasses, clovers, and trefoils will keep it down on pasture land if not grazed too closely. Infested stock roads should be narrowed to the breadth of the paved track, and the sides ploughed and cultivated alternately. It would pay in most cases to allow the landholder to take in the wasted border on condition of cleaning it, and keeping it clean.

The Stinking Mayweed has recently been proclaimed for the Shires of Maldon and Orbost, at the request of the local Councils.

The wild Chamomile, *Matricaria discoidea*, D.C., has also appeared, but is less objectionable, and is fairly common.

Bellis perennis, L. The common Daisy. May prove troublesome in poor pastures. It is best kept down by manuring the pasture, and encouraging a strong growth of herbage. On lawns it is best removed by loosening the soil, and pulling up after rain. If cut out, the parts left in the soil often shoot again.

Arctium Lappa, L. The Burdock. A native of Europe. It is easily distinguished from Thistles by the large lower leaves, often more than a foot square in area. The bracts on the head have hooked ends, so that the burr-like heads adhere to passing animals, the large, seed-like fruits each with a tuft of stiff hairs, ultimately falling to the ground.* It is a comparatively recent introduction, undoubtedly brought with impure agricultural seed, but is likely to spread. The plant is a biennial, often five

*The prickly heads have been used to attach advertisements to passers by, a doubly objectionable practice.

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STINKING MAY WEED OR FETID CHAMOMILE.

(Anthemis cotula, L.)

CHINESE SCRUB

(Cassinia arcuata, Rob. Brown.)

feet high. If merely cut down so that no flowering occurs, it may last for several years. Hence, on pasture land, the sole remedy is either to bring the land temporarily under cultivation, or to grub out the plants, pile and burn them before flowering. The plant is especially likely to establish itself on roadsides and waste places. Here, cutting before flowering would prevent further spread if thorough eradication is too costly.

Cassinia arcuata, R. Br. The Chinese Scrub. An erect shrub, the branches and under-sides of the leaves thinly woolly. Leaves narrow linear, rounded at the ends, or with short, recurved points, the margins closely rolled back. Flower-heads small and numerous in a long, loose, terminal panicle. Involucres cylindrical, often curved, not two lines long, straw-coloured, white or brown, the bracts very thin, smooth, and shining. Florets two, three, or rarely four. This native shrubby composite often attains a height of three to six feet, and is usually found on clayey ground, being very abundant in many parts, especially in the North. The popular name is a misnomer; it has no connexion whatever with the Chinese, being a native plant. It is quite useless as a fodder plant, though not actively poisonous. Stock rarely touch it, but if driven by hunger to browse upon it are bound to suffer. The plant is a perennial, seeds freely, and the seed are carried long distances by wind or in the wool of passing sheep. The seed have a limited duration of vitality in the soil.

The plants should be cut or grubbed out before flowering, at once piled in heaps, and burnt. Being somewhat resinous or oily, they burn readily when green. Scarifying and manuring the pasture will aid the grasses in suppressing seedlings, which may be cut or hoed if they become too large. Ordinary cultivation will keep arable land clean from this weed.

Proclaimed for the Shires of Maldon and Waranga.

THISTLES.

Under this head are included various species of *Carduus* and *Centaurea*. All the Thistles common in this State are proclaimed for the whole State, and all, with the exception of *Carduus arvensis*, L., are annual or biennial, occasionally lasting more than two years if the flower heads are continually removed without cutting down the plant close to the base. In all these cases, on pasture land, and, in fact, all land which cannot be put under the plough, the plants should be cut close to the ground, hoed up, or hand-pulled before they have attained any great size (six inches or so). The seedlings will then nearly all die without needing any treatment. If the plants are allowed to exceed six inches in height before treatment, the stem and root left after cutting will usually shoot again, and the upper part of large stems may ripen seed after cutting, so that the cut parts need to be piled and burnt with the aid of brushwood. It is often the case that the treatment of thistles is delayed until they have begun to flower, when, if the seed are allowed to ripen, all the trouble is in vain, since the plants would have died in any case as soon as seeding had exhausted them, and the handling merely favours the spread of the seed. It appears to be very generally the case that the notices under the Act are issued too late to be of much service, and that on this plea convictions are commonly suspended according to the provision at the end of Section 4 of the Act.* This provision reads: "It shall be lawful for any such Justices to suspend any conviction upon its being proved to their satisfaction that the person receiving such notice has used, and is using, reasonable exertions to destroy such thistles." It is difficult to see how any one who has allowed thistles

* See, for instance, Police Court Report, Charlton, 1st March, 1907.

to seed freely on his land, and infect that of his neighbours, can be said to have used reasonable exertions to destroy such thistles. Further, thistles that have begun to flower, if cut and burnt at once, or piled in heaps and covered with quicklime, will set free very little seed as compared with the same plants left standing. Even when fruiting is active, the plants can be cut on a rainy day without seed being spread, but in this case they must be handled wet, and either buried or covered with quicklime. Furthermore, fruiting plants, when dense, can be sprayed with kerosene, and burnt off standing, with little or no escape of seed, and without danger if a safety zone is cleared around the infested patch, and the burning done in calm weather.

Key to the Common or Proclaimed True, Star, and Burr Thistles.

1. (*a*) Florets in the head all equal and tubular. Seed-like achenes, with a long pappus of simple or branched hairs. Leaves usually very prickly. —True Thistles. (2).

(*b*) Outer florets usually larger and neuter. Pappus shorter than the achenes, and usually of simple hairs or scales, or absent. Leaves rarely prickly, but bracts of the heads fringed or very prickly.—Star Thistle. (5).

(*c*) Burred fruits, leaves not prickly, but radiating spines on the stem among them, and the fruits.—Burweed (*Xanthium spinosum*, L.).

TRUE THISTLES.

2. (*a*) Pappus of simple unbranched hairs 3
(*b*) Pappus of feathery hairs 4

3. (*a*) A large, stout plant, the leaves variegated with white veins, the flower large, purple, and drooping.—Milk Thistle (*Carduus Marianus*, L.).

(*b*) An equally tall (one to three or four feet), but more slender plant; the stems winged; the plant more or less cottony; the heads smaller, numerous, and clustered, and with pink or white flowers.—Slender Thistle (*Carduus pycnocephalus*, Jacq.).

(*c*) A still more slender plant, with heads of intermediate size, and the stem with narrow prickly wings from top to bottom. (*Carduus crispus*, L.).

4. (*a*) A stout biennial, leaves and bracts ending in stiff prickles, the flower heads few and long.—Spear Thistle (*Carduus lanceolatus*, L.).

(*b*) A perennial, with a creeping root-stock; very prickly leaves, and the bracts with numerous small prickly points; the flower heads small, numerous, and clustered.—Creeping or perennial Thistle (*Carduus arvensis*, L.).

(*c*) The less common Scotch Thistle (*Onopordon acanthium*, L.) is a large plant, with single large heads of purple flowers, winged and prickly stem, and the ovaries of the small, tubular flowers enclosed in small, scaly cups within the involucre of densely set small pointed green bracts.

5. STAR THISTLES.

5. (*a*) Plants with prickly leaves and heads, the latter large, with yellow and occasionally purple flowers, and the achenes with a densely clustered pappus of narrow pointed scales.—Saffron Thistle (*Kentrophyllum lanatum*, D.C.).

(*b*) Heads smaller, but spiny; leaves not spiny 6

6. (*a*) Flowers purple; no pappus on the seed-like fruits.—True Star Thistle or Calthrops (*Centaurea calcitrapa*, L.).

(*b*) Flowers yellow, the upper leaves running more or less down the stem as wings 7

7. (*a*) Fine pappus bristles nearly as long as the fruits. Terminal spines of the involucral bracts as long or shorter than the broad basal part of the bracts.—Malta Thistle (*Centaurea melitensis*, L.).

(*b*) Pappus longer than the fruit, and the terminal spines on the bracts much longer than the basal portions.—St. Barnaby's Thistle (*Centaurea solstitialis*, L.).

Carduus arvensis, L. The perennial Corn Thistle. This is commonly, but erroneously, called the Canadian or Californian Thistle. It is a native of Europe, Asia, and Africa. This is one of the greatest pests of both arable, and still more of pasture land, and fortunately is the only one of the TRUE THISTLES that is perennial. It grows on almost any soil. It can be kept down to a slight extent on pasture land by close-penning sheep on infested spots, when the stems are eaten down and trampled off. Freely pastured sheep usually leave it untouched unless pressed for food.

Various elaborate remedies have been suggested, but none are as effective as ploughing the ground, raking out and burning the rhizomes, and keeping the land under root crops and extra clean cultivation as long as may be required. Seeding on neighbouring waste land, roadsides, &c., must be prevented, since otherwise the seeds blow in again. In the soil the seeds do not appear to last for more than one or two years at the outside. The underground parts are weakened by frequent cutting, and still more by hoeing or hand-pulling, especially if the latter is performed after rain, when more of the rhizome comes up. When the land is once cleared, care should be taken not to reintroduce the plant with impure agricultural seed, or to allow careless neighbours to do so.

This plant can be told from most other thistles by its narrower leaves, more slender stems, and smaller heads of flowers, as well as by its creeping underground "roots."

The annual thistles are less injurious, and more easily eradicated if properly treated. All the annual thistles will develop as biennials under favourable circumstances, or if flowering is prevented by topping. The earlier they are dealt with the better. If the hoe is passed through the seedlings below the hypocotyl, that is at or below the surface of the ground, they die, and two hoeings early in the season should be sufficient to keep a crop clean. On pasture land, it is better to wait until the plants have attained an appreciable size, but still show no signs of flowering, because wherever the pasture is dense the seedlings fail to establish themselves. The plants should be spudded out, taking care that the cut is made well below the surface of the ground. If not too large, the plants shrivel without flowering.

On a small scale, hand-picking of seedlings is effective, especially after rain, when they usually come up whole. It is no use clearing land unless attention is also paid to the borders of fields, roadsides, and to waste places, especially round the farm buildings and in the home paddock, since the continual in and out traffic is peculiarly liable to spread weeds from such a centre of infection.

Much has been said by interested persons as to the value of thistles as fodder in times of drought, and even in times of plenty. They have a slight fodder value, especially in the form of silage, and the large milk thistle is about the best for this purpose. To cultivate thistles for fodder

would, however, be an act of madness, which is unconsciously performed in many parts of the State. They are among the poorest of fodder plants, and their use is always dangerous. All spiny plants are injurious in fodder, owing to the continual danger to the digestive tracts of the animals using them as food, and spines were, in fact, developed by plants in order to form a protection against browsing animals. The same danger is present in a somewhat lessened form when the thistles are made into silage, and the taste which stock sometimes show for thistles in the fresh condition is a depraved one, like that of man for injurious drugs or stimulants, or of a calf for a dish-cloth. It no more shows that the thistle is a good fodder plant than that the Cape Tulip, Darling Pea, and Hemlock are good fodder plants because stock often eat them, and so kill themselves.

Another point needing emphasis is in regard to the plea commonly accepted by Justices of the Peace that when, as is often the case, notice is not served until the thistles have flowers, it would do more harm than good to take any steps for their eradication. The plea is bad both in law and in science. If a man has allowed a whole crop of thistles to approach seeding, there is no reason why he should not be compelled to spray the whole with kerosene and fire it, which would at once stop the spread of seed to neighbouring land. Even if the plants are merely cut, piled in heaps, and burnt, or covered with quicklime, the spread of seed is enormously decreased, as compared with the same plants left standing. It is mainly for the sake of his own land that a man should treat thistles as early and as often as possible.

So long as any standing thistle is still alive, it continues to be a danger to a man's neighbours, and rightly makes him liable to the penalties of the Thistle Act. The admission of the above plea puts a premium on neglect or delay. There is no bad time for cutting thistles. All times are good, but the best time is when they are young, and the least suitable time is after they have flowered. The common statement that thistles die out spontaneously after three years is quite untrue, unless they are cut or otherwise treated. Thistles naturally are especially vigorous when they first reach new land, but if left to themselves will propagate indefinitely, although in the absence of grazing stock they may ultimately be overpowered by the native scrub. It cannot be denied that most of the Shire Councils carry out the provisions of the Thistle Act imperfectly, or not at all, and it is doubtful whether it will be regularly and systematically administered until its control is vested in the Department of Agriculture, as in the case of the Milk and Dairy Supervision Act.

The remaining True Thistles are all annual, or occasionally biennial, and are proclaimed for the whole State, with the exception of *Carduus crispus*.

Carduus crispus, L. The Crisped Thistle. A native of Europe, Asia, and Africa. This is perhaps the least common and least dangerous of the thistles.

Carduus lanceolatus, L. The Spear Thistle. A native of Europe, Asia, and Africa. It has lanceolate leaves decurrent on the stem, which is tall and with fairly large flower heads. It is often wrongly termed the Scotch Thistle. The true Scotch Heraldic Thistle (*Onopordon acanthium*, L.), though rare, is also proclaimed, and has still larger flower heads.

Carduus Marianus, L. The Spotted or Milk Thistle. A native of Europe, Asia, and Africa. It is a very large form, annual, or biennial. One plant may cover an area of four or more square feet, but it is less harmful than most of the thistles. It and the preceding have a slight

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St BARNABY'S THISTLE

(Centaurea solstitialis, Linné.)

value as fodder in times of stress, but the land covered by thistles, if properly utilized, would have yielded vastly superior, more nutritious, and abundant as well as less dangerous forage. Thistles have been termed a drought insurance by certain apologists, but such insurance is like burning all one's inflammable goods to avoid the risk of fire. Apart from water storage and irrigation the best insurances against drought are silos, fodder storage, root crops, mixed rotation farming, and good deep cultivation.

Carduus pycnocephalus, Jacq. A native of Europe, Asia, and Africa. It is sometimes termed the Slender Thistle, and more commonly the Shore Thistle, although in Victoria it grows just as well inland. It is annual or biennial, the latter especially if flowering is prevented.

Three STAR THISTLES, all of them annual, are proclaimed for the whole State. They all have smaller heads than the true thistles, and have the pappus on the "seeds" less developed, or entirely absent, as in the true Star Thistle (*Centaurea calcitrapa*). This plant sometimes has the heads reduced to small clusters of prickly bracts without any perfect flowers.

Centaurea calcitrapa, L., is the true Star Thistle. A native of Europe, Asia, and Africa. It, like the following, is entirely without value, and exceedingly troublesome, if neglected. The star thistles, as a whole, on account of their lesser power of wind dispersal seem to spread less rapidly than the ordinary thistles, and since the duration of the seed in the soil seems to be between one and three years, local treatment more readily suppresses them with less danger of reinfection.

Centaurea melitensis, L., the Maltese Thistle, and *Centaurea solstitialis*, L., St. Barnaby's Thistle. They are natives of Europe, Asia, and Africa, and as both have yellow florets, they are easily confused. The latter has longer spines on the heads and longer bristles on the seeds.

Centaurea solstitialis, L. St. Barnaby's Thistle. A stiff, erect annual, one to two feet high, with few branches, and covered with a white cottony wool. Radical leaves pinnatifid (like a feather); upper leaves small and linear, decurrent in long, narrow wings along the stem. Flower heads solitary at the ends of the branches, nearly globular; the innermost bracts ending in a small shining appendage; the intermediate ones in a long, spreading prickle, with one or two small ones at its base; the outermost usually with only a few small, palmate prickles. Florets of a bright yellow. Fruiting heads with a soft white pappus.

An introduction from Southern Europe. It should be dug out with a hoe or mattock before the seeds mature, piled and burnt. It often flowers after cutting, if fairly old, and left too long.

The Star and Maltese Thistles were proclaimed in the original Act. St. Barnaby's Thistle was proclaimed for Wodonga in 1899, then for Maldon and for the whole State in 1908.

Kentrophyllum lanatum, D.C. A native of Europe, Asia, and Africa. The Saffron Thistle is widely spread over the whole State, and in many districts is reported to be the worst of all the thistles.

Proclaimed for the whole State.

Carthamus tinctorius, L. The Safflower is occasionally sent in as a weed evidently having escaped from gardens, but it appears to be of trivial importance as a weed.

Chrysanthemum. Three introduced *Chrysanthemums* are naturalized in Victoria, but none are as yet very troublesome.

C. segetum, L. A native of Europe, Asia, and Africa. Is an annual plant, a foot or more in height, with yellow flower heads, and the upper

leaves clasping the stem. The "seeds" are thin and flat, and may be carried by the wind from place to place. They may remain living in the soil for some years, like those of Charlock, and this is unusual among Compositæ, the seeds in this order being usually short-lived. Cleanly cultivation, coupled with hoeing or hand-weeding, keeps the plant down, but it takes some years to clean badly infected fields, even with the aid of root crops and rotations.

C. Leucanthemum, L. The Ox-eye Daisy. A native of Europe and Asia. It is a perennial weed of pastures and waste places, but not troublesome unless neglected. Its presence is usually a sign of poverty in the soil; manuring and scarifying will greatly diminish it.

C. Parthenium, Bernh. The Feverfew. A native of Europe. Sometimes occurs probably as a garden escape. It is a useless perennial, obnoxious on account of its unpleasant smell, and is grown in gardens by people with a blunted olfactory sense.

Cichorium Intybus, L. Chicory. A native of Europe and Asia. A fairly common escape from cultivation. The plant is perennial, and has a certain value as a fodder plant, if not too abundant, especially when young. If allowed to run wild, however, and to remain uncropped, the plant soon degenerates, especially on poor, dry soils; the root loses its value as a surrogate for coffee, and the stem becomes hard and scrubby. In hay, the leaves are apt to dry black, and somewhat deteriorate its value. To eradicate it from arable land, the tap roots must be raked out or picked out after ploughing, and the formation of seed prevented.

Cryptostemma calendulaceum, R. Br. The Cape Weed. A tufted plant, almost stemless. Leaves in a rosette, obovate, usually segmented, three to six inches long, cottony white beneath, glabrous above. Flowers solitary on slender stalks, one to one and a half inches diameter. Ray-florets yellow, spreading; inner ones tubular, brownish. Achenes woolly. This plant is a native of South Africa, and was collected in Western Australia as early as 1838, thence spreading to South Australia and Victoria. Hence the association of Mueller's name with the introduction of this pest is hardly just. The plant is an annual, though on rich land, when closely cropped, it may become more or less perennial. It also spreads readily and widely by means of its numerous seeds, and though of some use for grazing while it is growing, it covers an amount of ground disproportionate to its productive powers, and dies down during summer, leaving the ground bare. The supporting value of a permanent pasture is that of its weakest month, just as the strength of a chain is that of its weakest link. Even when dry fodder or silage is available, completely bare pastures in summer time are a serious matter, and owing to its mode of growth the ordinary form cannot be cut to any extent for silage. On rich ground, when close together and shaded, the plant is larger and more erect, but is then rather watery. One form has a taller, leafy stem, and is of somewhat greater value, but on the whole the weed renders pasturage returns more uncertain and precarious, while in gardens and on all arable land it is an unmitigated pest. In addition, stock are apt to suffer or even die when suddenly turned into paddocks where Cape Weed is especially abundant and luxurious.

Tillage and cultivation keep it under, and hence pasture land can be cleaned by ploughing and cropping, coupled with rotation farming. Periodic resting and the avoidance of over-grazing also helps to keep it down in pastures. The seed appear to have a limited vitality in the soil, and hence are soon exhausted if flowering is prevented by hoeing, cultivation, or hand-picking.

Proclaimed for the Shires of Maldon, Poowong and Jeetho.

O. Wauer, Del. J. R. Tovey, Direx. J. Kemp, Acting Govt Printer.

CAPE WEED

(Cryptostemma calendulacium, Rob. Brown.)

Erechthites quadridentata, D.C. The genus is closely allied to *Senecio*, and the species in question is one of the many plants known as cotton-weed, owing to its being covered with a white cottony wool, especially when young. It is a native plant, one to three feet high, with a perennial rhizome, and seeding freely. In many parts of the Western District it has taken complete possession of entire fields, largely as the result of neglect. Repeated cutting and the prevention of flowering will keep it down on pasture land, but it is best suppressed by a summer fallow, followed by a root crop or leafy fodder crop, the first ploughing taking place before the plants are half-grown.

Erigeron canadense, L., the Canadian Fleabane, and *E. linifolius*, Willd., the Flax Leaved Fleabane. Both plants are natives of Europe, Asia and Africa and are both common weeds in pastures, gardens, waste places and neglected fields. The latter plant is usually taller and more slender, the former being under one to two feet. Both have white heads of flowers, the rays being small and white and the pappus also white. The seeds are readily dispersed by the wind, but do not appear to have a prolonged vitality in the soil. The weed is a spasmodic or cyclic one, being much more abundant in certain seasons than in others. This is because the possible number of new plants represented by the seeds is always vastly greater than the actual number, so that favourable conditions have ample scope for their action, even though the plants of one season are almost wholly derived from the seed of the previous season.

The plants have no appreciable economic value, but are not actively injurious. The powdered seeds are sharply aromatic and have a slight value for the purpose indicated by the popular name. The weeds are easily kept under on pasture land by cutting down, well before flowering, so that no seeds ripen on the ground after cutting. Hoeing and good tillage easily keep the plant under in gardens and arable land.

Helichrysum apiculatum, D.C., a native of Australia, has been known to cause death by the matting of the hairs from the plant into balls in the stomachs of stock. The pappus hairs of many Compositæ (Aster, Vittadenia, &c.) will produce the same effect if swallowed. The prevention is by cutting down the Composites before flowering and seeing that the stock have plenty of green forage, and if necessary an occasional soft mash.

Hypochœris radicata, L. The Flat Weed or Cat's-ear. The plant is a perennial with its lobed hairy leaves flat on the ground and erect leafless stems bearing rather large yellow heads of flowers. The "seeds" have a long beak terminated by a feathery pappus, the whole habit being somewhat that of a dandelion. It contains a bitter milky sap which makes it unpalatable, though not entirely poisonous. The plant is widely spread and takes almost complete possession of the ground in some districts to the serious detriment of the pastures. An exclusive diet of this weed could not help but injure stock eventually. Manuring, scarifying the surface and the encouragement of the taller grasses by avoiding over-stocking help to suppress it. Pastures brought temporarily under cultivation are readily cleaned of the weed, especially if the long perennial tap roots are raked out after ploughing. On a small scale the plants can be hoed up before flowering.

Hypochœris glabra, L., is also fairly abundant but is a smaller annual plant without hairs, and much less injurious. Both plants are introductions from Europe or North America.

Inula graveolens, Desf. The Stinkwort. A hairy viscid (clammy or sticky) much branched, large herb, woody at the base; the lower leaves oblong, lance-shaped, imperfectly toothed; the upper leaves very narrow, and with even margins. This pernicious weed is an immigrant from the Mediterranean regions which has spread through this State from South Australia, where it has long been a most troublesome weed especially of waste or neglected pasture land. The plant is an annual reproducing by its abundance of small feathery seeds, which may be carried by wind, water, and animals from one district to another.

It is easily suppressed by cultivation, fallowing and root-crops, but such treatment must be carried out over a large area if any permanent good is to ensue. The seeds mostly germinate in September or October, so that the seedlings are suppressed by a growing leafy crop, but after early cuttings for hay, or in the stubble of grain crops, later seedlings spring up and flourish in abundance.

Hedges aid in preventing the re-entry of seed into cleaned fields. Waste places infested by the weed should be planted with trees, preferably pines and other conifers. The plant is a sun-lover and will not grow in dense shade. On the borders of fields, &c., it needs to be kept closely cut, or hand-pulled before flowering, and usually this is easiest after rain. Pulled or cut plants will ripen their seed on the ground, unless rapidly dried and burnt with the aid of brush-wood, or piled in pits and covered with quicklime. Seeds do not appear to retain their vitality for longer than two or three years in the soil, and mostly not for more than a year, but sufficient remain to enable this weed to spring up season after season and suppress quite strong pasture plants if they are shorter than it is itself.

The plant has less value for green manuring than any of the plants ordinarily grown for that purpose, even when ploughed under before seeding. It is not only useless for fodder but actually injurious. Cows rarely touch it, but sheep will eat the young shoots and aid in keeping it down somewhat if other food is scanty. The plant is apt to give the flesh an unpleasant flavour, and milk and butter are still more readily and rapidly affected. ☞ Large quantities, particularly if in flower when eaten, may block the digestive canal, or even produce poisonous effects, especially on breeding ewes. An extract from the plant given frequently in large doses produces paralysis, mainly of the hind limbs. The plant appears to be more injurious when in flower than when young.

The dried plant has been used for curing hams and bacons, and the extract has a certain medicinal value, but not sufficient to justify its cultivation or place it in any other character but that of a pernicious and even dangerous weed.

Proclaimed for the whole State.

An allied plant, the Elecampane (*Inula Helenium*, L.), also has a certain medicinal value but it is a possible source of future trouble, and being a coarse perennial would be even more difficult to suppress when once established.

Lactuca saligna, L. The Willow Lettuce. A native of Europe, Asia and Africa. It is an annual or biennial, not hitherto plentiful or of any great importance. The same applies to the Prickly Lettuce (*L. scariola*, L.). They can be distinguished from the Sow Thistle by their stalked pappus, and from Hawkweed by the flattened seeds.

Madia sativa, Mol. The Pitch Weed. A native of America. This erect annual with opposite or alternate narrow pointed leaves, and small yellow heads of flowers, is obnoxious on account of its sticky hairs, and

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STINKWORT.

(Inula graveolens, Desf.)

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PITCH WEED.

(Madia sativa, Mol.)

PLATE 18.

J. Wauer lith. J.R. Tovey, Direxit J. Kemp, Acting Govt Printer

RAGWORT.

(Senecio Jacobaea, Linne)

though not of any appreciable economic value is only locally abundant or troublesome. Proclaimed for the Shires of Maldon and Violet Town, The plant is a native of Chili but probably reached Victoria *viâ* Europe where it is sometimes grown for the nutty cooking oil extracted from its seeds. It was abundant in the Kyneton district as far back as 1871. Since the seeds do not appear to be long lived, and the plant is an annual, it is easily kept under by cultivation and hoeing, if care is taken to keep waste places and the edges and borders of fields clean. The plant may be largely pulled out of pastures by using a close toothed horse rake or scuffle, after rain and before the plant has ripened its seed.

Picris hieracioides,* L., and *P. echioides*, L. The Ox Tongue. Natives of Europe, Asia and Africa. They are annuals or biennials, distinguished from Hawkweed by their feathery pappus. The latter, especially, is covered with stiff hairs the ends often minutely hooked. Hence, the heads are apt to cling to passing animals and the seeds are also wind borne. The plants are likely to prove troublesome if neglected, but can be kept down by cultivation, and the prevention of seeding. They are not poisonous but useless or even objectionable in fodder.

Senecio vulgaris, L. The Groundsel. A native of Europe. The seed of this small annual are readily carried by the wind to cultivated ground, but it is easily kept under by hoeing and cultivation, and does no harm on pastures.

S. Jacobæa, L. The Ragwort. Leaves more or less divided, often with a woolly down beneath. Root-stock, short and thick but without any creeping shoots. Stem branched at the top only, unless cut down or eaten down by stock when it breaks out from the base. Usually two to four feet high, with large yellow heads, surrounded by a few small outer bracts and larger green ones tipped with black. Usually twelve or more ray florets, the fruits without hairs, but those of the disc shortly hairy. The Ragwort (from its ragged leaves) is a native of Europe and North Asia, and is a much larger plant than the groundsel, besides being a perennial. It has wind borne seeds, and rapidly spreads on waste ground and on pastures if allowed to seed. When young, sheep graze it down if penned closely, but if allowed to grow up it should be hand pulled after rain before the seed have ripened, and the plants piled and burnt with the aid of brush-wood, or covered with quicklime, or buried in pits. Cultivation soon suppresses it, in spite of its perennial character and free production of seed.

Proclaimed for the Shires of Phillip Island and Woolamai, South Gippsland, Woorayl, Poowong and Jeetho, Maldon, Mirboo, and Colac, at the request of the Shire Councils concerned.

☞ Some exotic species of *Senecio* appear to be poisonous. Thus, in the *Agricultural Journal of the Cape of Good Hope*, 1906, p. 663, it is stated that *Senecio Burchelli*, D.C., and *S. latifolius* produce straining sickness, cirrhosis of the liver, &c., in horses and cattle. By *S. latifolius*, presumably, the South African, *S. barbellatus*, D.C. is meant, the true *S. latifolius*, Banks and Sol., being a New Zealand plant only. Four to eight ounces per diem of either plant produced death in a few days to a month, and lesser quantities caused gradual weakening and emaciation. The action was apparently more rapid on oxen than on horses, but sheep were not tried. It appears to be a true poisonous action from the symptoms, and not, for instance, due to mechanical gastric irritation by pappus hairs or the like. In any case, since so many South African plants have been introduced to

* Sometimes termed the Hawkweed Picris.

Victoria, and proved pests, it would be well to look out for these ones, and also for cases of supposed poisoning by *Senecio*. Indeed, Professor Gilruth informs me, from New Zealand experience, that Ragwort (*S. Jacobæa*) is undoubtedly poisonous, especially to cattle and horses, but less so to sheep. The symptoms are, however, only shown (cirrhosis of liver, &c.) after one to three months' continuous grazing on the plant, and in some cases even if the stock are removed while they still appear healthy, after-symptoms leading to fatal results may manifest themselves. Nevertheless, the plant may be safely grazed down by sheep if they are not allowed on it more than a week or so at a time, and given plenty of silage feeding, fodder or roots, or good grazing in between.

Sonchus oleraceus, L. The Sow Thistle. This is an annual weed, plentiful in many places, but hardly a serious weed. The pappus is seated on the flattened "seeds," which are numerous and readily spread. The plant is eaten by stock, and does them no injury, though not specially nutritious. It forms good green feed for fowls. On arable land and in gardens it can be easily kept down by cultivation, hoeing, and the suppression of seeding, since the duration of vitality of the seed in the soil is very limited. The plant is a cosmopolitan weed, like the common dandelion. The variety "asper" has rougher leaves, and the Cornfield Sow Thistle is a distinct species, *S. arvensis*, L.

Taraxacum officinale, L. Dandelion. This perennial plant is a far more troublesome and abundant weed in England than in Victoria, except in moist ground. In spite of its tap root, the plant is killed by severe drought, and does not flourish under dry conditions. Though of no practical value as fodder or otherwise, the plant is not actively harmful or injurious. Where it is abundant, cultivation keeps it under, but it is exceedingly difficult to eradicate completely, since unless the whole root-stock is removed the plant shoots again, and it can stand a fair amount of shading by other vegetation. This plant, like the Stinkwort and other composites, is likely to be a troublesome weed along irrigation channels, continually spreading by seeds floating on the water, and being carried by it to uninfected irrigated land. This can be prevented by screening the water or by keeping the banks of the channel clean.

Tragopogon porrifolius, L. Salsify or Goat's Beard. A native of Europe, Asia, and Africa. This plant is often grown in gardens for the sake of its edible roots, and appears occasionally as a weed escaped from cultivation, but has not proved serious hitherto. It will grow in most soils, but the root is only edible when grown in rich garden soil. The young plants are eaten by cattle, but not when in flower, and the winged seeds are carried everywhere by the wind.

Xanthium spinosum, L. The Bathurst Burr or Spiny Burweed. A native of Europe, Asia, and Africa. It is peculiar in having the male and female flowers in separate heads, the females (two) together, and forming a two-seeded fruit. One seed usually germinates in one year, the other in two to three years, owing to the seed coat of the latter being less permeable to water and oxygen. Seed in the soil are not exhausted, therefore, until after three years.

The plant appears to have been introduced about 1850 into Australia, with impure agricultural seed, and was at first confined to roadsides, but soon was spread by stock in all directions, is now abundant and troublesome in New South Wales and Queensland, and has also reached Victoria. The burrs seriously impair the value of fleeces, and also adhere to the tails of stock and manes of horses. A few pounds expenditure when the weed first

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CALIFORNIAN STINKWEED OR SHEEPWEED.

(Gilia squarrosa, Hook. and Arn.)

appeared, coupled with proper regulations to prevent its reintroduction with impure seed, would have saved Australia an annual loss which cannot be estimated at less than several thousand pounds. The weed is essentially a pastoral one, easily kept under by cultivation, and hence partially suppressed by combined pasturage and rotation systems.

It has been recorded as poisonous to stock, but on false grounds. They do not touch it under ordinary circumstances. If eaten by them when pressed by hunger it would, however, undoubtedly be apt to exercise an injurious mechanical action, just as in the case of many woody or spiny but non-poisonous weeds.

Proclaimed for the whole State.

POLEMONIACEÆ (PHLOX FAMILY).

A small family of bitter-tasting herbs, useless as fodder, and of no pronounced economic value. One member only, an introduction from North America, has increased to such an extent as to make it a pest.

Gilia squarrosa, Hook and Arn. The Californian Stink Weed, Digger's Weed, or Sheep Weed. This is a rather rigid plant, not exceeding one to two feet in height. The stems branch copiously in more or less zigzag fashion, and, like the leaves and calyces, are covered with glandular viscid hairs, emitting a fetid smell. Leaves one to two inches long, deeply cut into pointed pinnate segments, the upper leaves and bracts simpler and spiny. Flowers in dense heads, surrounded by green, leaf-like bracts. Calyx of five pointed segments, united at the base, and exceeding the pale-blue, occasionally white, corolla lobes. Stamens and trifid stigma enclosed within the tube of the corolla.

The plant is a native of California, and other parts of North America (hence Californian Stink Weed), and was originally found on moist ground in mountain valleys. In Victoria, however, it withstands drought, and spreads rapidly, being a freely seeding annual or biennial. The plant is a troublesome and aggressive but non-poisonous weed. On cultivated land it is easily kept under by clean cultivation, by the growing of root crops, and by the destruction of seedlings by hoeing and working the soil during dry weather. On pastures and waste places, cutting before seeding will help to keep it down, and if repeated until the seed in the soil is exhausted will eventually suppress it. The seed in the soil appears to be short-lived, and if the pasture is periodically rested, and a good stand of grass maintained, this aids in preventing seedlings from re-establishing themselves.

Proclaimed for the whole State, March, 1907.

PRIMULACEÆ (PRIMROSE FAMILY).

They form a small order, easily recognized by the five stamens arising from the corolla, the superior ovary with one cavity, and the seeds arising from a mound in the centre of it. Apart from *Cyclamen* and *Anagallis*, the order is a non-poisonous one, which includes many decorative plants, but otherwise has no special economic value.

Anagallis arvensis, L. Pimpernel or Shepherd's Weather Glass. (The flowers close in wet weather.) An introduction from Europe. The scarlet flowers and creeping stems with soft green leaves of this small annual are now to be seen almost everywhere, but it is too weak to be a serious pasture or crop weed, although sometimes troublesome in gardens, if allowed to seed freely. The plant can ripen and shed its seed within three weeks, and the seed appears to be able to retain its vitality in the soil for at least one or two years.

A blue-flowered form, *A. coerulea*, is also found occasionally. The pimpernel has been reported to render the chaff from oat crops infested by the weed unpalatable to stock. In pastures the weed is usually untouched. ☞ Eaten in quantity, it exercises a diuretic action, and it has narcotic properties, sufficiently pronounced for it to be classed as a poisonous plant. An extract is sometimes used to expel leeches from the nostrils of dogs in India, and when swallowed has been known to produce fatal results.

PLANTAGINACEÆ (PLANTAIN FAMILY).

The plants of this order have a bitter, somewhat astringent taste, rendering them more or less unpalatable. Three common weeds belong to this order. The small flowers, grouped in chaffy heads or spikes on a long stalk, readily characterize the order.

Plantago lanceolata, L. The narrow-leaved Plantain, Rib Wort, or Rib "Grass." This troublesome weed, though not actively injurious or poisonous, takes up the place of better vegetation on pasture land. Stock only eat it sparingly when better fodder plants are available, and hence it is apt to increase and spread unduly. It is of some use on poor, neglected, uncultivated, and unmanured land, but is essentially a low grade pasture plant, although highly recommended by various Victorian seedsmen, and commonly sold in grass mixtures. In the United States, Rib "grass" is considered to be of comparatively little value for cattle as compared with other forage plants, even on primitive pastures, though yielding a little late feed. In England, special care is taken to avoid the introduction of this plant to pasture or arable land with agricultural seed. Even on poor land, its presence does not improve the land as leguminous plants do, but rather tends to its deterioration. Once established, it is very difficult to suppress. The land must be ploughed, the perennial roots raked out, the soil stirred and hoed to destroy seedlings, and placed under a well manured root crop for at least one season before seeding down again.

Plantago major, L. Broad-leaved Plantain. A native of Europe, Asia, and Africa. This weed is somewhat similar, but is principally found near habitations, and is not likely to do any great harm.

Plantago Coronopus, L., is a small cosmopolitan plantain, quite useless, and widely spread, especially on poor, hard, dry soil. Its abundant presence on a pasture may be taken as an indication that the soil needs stirring, cultivation, and manuring. It is called the Buckshorn Plantain.

SOLANACEÆ (POTATO FAMILY).

A large order which, although it includes such useful plants as the Potato and Tomato, also includes many troublesome weeds and dangerous poison plants. Sepals, petals, and stamens are five in number, and the superior ovary is composed of two carpels. The anthers usually form a yellow cone in the centre of the flower. The plants are herbs or shrubs, often spiny, and sometimes densely woolly.

Solanum sodomæum, L. The Apple of Sodom, often wrongly called the Kangaroo Apple, which is a native plant, *Solanum aviculare*, Forst. Both have flowers like those of the potato, and rather apple-like fruits. ☞ But the Apple of Sodom is bitter and poisonous, its leaves are much divided and prickly, and prickles occur also on the stem and calyx. The Kangaroo Apple is supposed to be edible, the plant is not prickly, and the leaves are either simple or with two or three large lobes.

The Apple of Sodom is an introduced plant—a native of Africa—obnoxious, not only on account of its prickly character, but also as being highly poisonous. It is widely spread, and owing to its continued increase

APPLE OF SODOM.

(*Solanum sodomaeum*, Linné)

has recently been proclaimed for the whole State. Fortunately, well-fed stock usually leave the plant severely alone. Although a perennial, it is not difficult to radicate if taken in time, and cut down before flowering. Two or three cuttings a year will soon exhaust it, but if the plant is dug out or pulled up with the roots, dried, piled, and burnt, the results are more satisfactory. On arable land, cultivation easily keeps it under. The fruits are the especially poisonous part, and have been known to cause the death of children. The solanin they contain is an alkaloid, and not an irritant poison. The symptoms aie congestion of the blood-vessels of the stomach and thorax, sweating, dimness of sight, dizziness, vomiting, and purging. The two latter will often, if aided, remove the dangerous symptoms.

The Apple of Sodom is a spreading or diffuse shrub or herb of one to three feet. Foliage green, but sprinkled as well as the branches with a few small star-shaped hairs. Prickles stout, often thickened downwards on the stem and leaves, more slender on the calyces. Leaves deeply pinnatifid, with very blunt, rounded, obovate, or spathulate lobes, often wavy; the whole leaf three to six inches long. Flowers in small clusters on short and simple rarely once forked steams. Calyx divided to the middle into blunt lobes. Berries globular, rather large, variegated green and white, or finally yellow.

Proclaimed for the whole State, February, 1907.

Solanum nigrum, L. The Black or Common Nightshade. It is a native of Europe and Africa, and is a weak annual or biennial, a foot or more in height, with black, red, yellow, or green berries. It is supposed to be a naturalized alien, but was collected in Australia, growing apparently wild, more than a hundred years ago. Although useless as a fodder plant, it possesses no virulent poisonous properties, and as a rule stock do not touch it. The plant is commonly regarded as highly poisonous, partly owing to confusion with the ☞ Deadly Nightshade (*Atropa Belladonna*), which is fortunately rare, and partly owing to hasty generalization. A small amount of Solanin is present in the stem and berries of *Solanum nigrum*, but these are usually less poisonous than green potatoes, in which alkaloids also appear. In addition, stock do not touch it at all unless starved. Solanin causes pain, tremors, and purging. Belladonna poisoning causes staggering gait, paralysis, and slow respiration. Death ensues rapidly if sufficient has been eaten. The berries of the Black Nightshade are often eaten by children without any ill-effects beyond perhaps a stomach ache, or, if eaten in excess, sickness or purging. They have even been used instead of raisins for plum pudding with no results out of the ordinary. It is possible that *Solanum nigrum* may develop more Solanin in the dry, sunny climate of Australia than elsewhere, but, if so, we have no evidence of the fact. The Black Nightshade, being of short duration, is easily kept down if the formation of seed is prevented.

☞ *Nicotiana glauca*, Graham. The Tree Tobacco. This is a shrubby garden escape introduced from South America, which seems likely to become a nuisance in some of the Northern districts, though of use for producing rapidly growing shelter hedges. In excess, the plant is undoubtedly poisonous, though moderate quantities can be eaten without serious consequences. Fortunately, it is not very palatable, although, as in the case of many poisonous* or injurious plants, stock may acquire a morbid taste for it. The plants should be dug up, piled, and burnt before flowering. Deep ploughing buries any seeds present in the soil, and they soon die.

* It has recently been stated to cause blindness in stock.

☞ *Nicotiana suaveolens*, Lehm. This is a similar but small native tobacco. Like the former, it is comparatively resistant to drought, is also feebly poisonous, and is apt to become a troublesome weed if allowed to spread.

☞ *Datura Stramonium*, L. The Thorn Apple. This is a stout erect annual often over two feet high with forked branches between which or at their ends the shortly stalked solitary flowers arise. It bears large almost triangular irregularly toothed leaves. The long tubular calyx falls off after flowering leaving a more or less prominently toothed rim under the capsule, which usually splits into segments during ripening. The corolla is large white or purple, and with five short usually yellowish points. Capsule globular, prickly, with numerous dark wrinkled seeds, unlike those of any common cultivated plant.

The Thorn Apple is a native of the Indies originally, now spread over the whole globe. It appears to be spreading over Victoria, and contains a highly poisonous narcotic alkaloid—Daturin. Fortunately, the strong bitter taste of its leaves usually keeps stock from eating it, but this very fact and its abundant production of seed aids the plant in spreading rapidly. As an annual, it can be kept under on pasture land or waste places, by hoeing or pulling up before it has time to seed. If the plants are at all old they should be piled and burnt on the spot to destroy the seeds. On arable land it is easily kept under by good cultivation, harrowing to destroy seedlings as the seeds germinate, or by the ordinary processes of rotation farming. If once allowed to seed freely, seedlings may continue to appear for several years.

Proclaimed for the whole State.

Lycium horridum, Thunb. The Horrid African Box Thorn. This plant is easily recognised by its thorns and red berries. Several species of this genus were recommended in Mueller's *Select Plants* for introduction as hedge plants, and this advice has unfortunately in some cases been followed, without reasonable thought of the dangers of the plant in a thinly settled district. Owing to a clerical error, the plant was originally proclaimed (1904) as *Lycium afrum*, L., the true African Box Thorn, naturalized in Southern Europe as a troublesome weed but still scarce as a naturalized weed in Victoria. None of these plants are better hedge plants than Tea Tree, Hawthorn, Pittosporum, Holly, Privet, Pepper, Tree Mallow, Tree Lucerne, Gorse, or Acacia. The latter three are nitrogen fixers and hence enrich the soil instead of impoverishing it. They will grow on equally poor and dry soil, and when kept properly cut and trimmed they do not flower or spread to any extent. At the same time, they are equally impenetrable, especially if a strand or two of barbed wire is run through the centre of the hedge two or three feet from the ground. Gorse especially yields better shelter, although liable to burn in dry districts. The Box Thorn, however, will flower and produce its orange-red berries on the older wood, even when closely cut. These are eaten by birds which, voiding the undigested seeds, carry the plant far and wide. If neglected, it may grow to a height of twelve feet and form an almost impenetrable jungle. To destroy it, the plants should be cut down before flowering, the root-stocks grubbed out and the whole piled and burnt. Seedlings are easily destroyed by hoeing or mowing.

It was proclaimed for the Shires of Bacchus Marsh and Melton at the request of the shire authorities concerned, and in 1908 the proclamation was extended to the whole State, after further requests for proclamation had been received.

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THORN APPLE.

(Datura stramonium) L.

PLATE 19.

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AFRICAN BOXTHORN.

(Lycium horridum; Thunberg.)

L. White Del

A. J. Ewart, Direx

J. Kemp, Govt Printer

DODDER.

(Cuscuta Epithymum.) L.

The name Box Thorn is really a mistranslation of the German word "Bocksdorn" or of the Dutch "Boksdorn" used at the Cape. The plant has no affinities with the true Box (*Buxus*), and the name should be etymologically Bucksthorn, but as there is already a Buck Thorn (*Rhamnus*) it is advisable to retain that of Box Thorn for *Lycium*. The case is comparable with the corruption of the French "ecrevisse" into the English "cray-fish."

For the reasons for placing this plant under the Thistle Act, see page 26.

☞ Among the native Australian genera of Solanaceæ two appear to be wholly poisonous, namely, *Anthocercis* and *Duboisia* or Pitury, but both appear to be unpalatable to stock and to be untouched by them except under very special circumstances. *Anthocercis albicans*, Cunn., is a Victorian species. Duboisin sulphate is used by oculists to dilate the pupil of the eye in those cases in which atropin iritates the eye unduly. It is supposed to be much more poisonous and Dr. Barrett informs me it is only sparingly used. It is quite possible that dust and fluff from these plants when dry might injure the eyes of animals browsing among them, and cases of blindness in stock are not uncommonly referred by stockmen to the agency of plants. So far, I have been unable to trace any such case to a definite plant.

CONVOLVULACEÆ (CONVOLVULUS FAMILY).

The flowers are four or five partite, often showy, the ovary superior, the capsule small and containing two to six seeds.

A small order of climbing, twining, or parasitic usually perennial herbs, which includes a few decorative plants but several troublesome or dangerous weeds.

Cuscuta. The Dodder. This annual parasite is easily recognised by its slender, twining, yellowish-green, practically leafless stems attached by minute suckers to the host plant, and bearing clusters of whitish or pinkish flowers. It is as great a pest to agriculture as the Mistletoe is to forestry. Two native species (*C. tasmanica*, Engelm., and *C. australis*, R. Br.), are known and have played some part in keeping down native and introduced weeds (St. John's Wort, &c.). The most injurious dodders appear to be the introduced ones (*Cuscuta epithymum*, L., *C. europæa*, L., *C. Trifolii*, Bab., &c.), which are continually imported into Australia and New Zealand with impure agricultural seed. These parasites will destroy any leguminous crop if unchecked. Where a whole field is infested, the entire crop should be ploughed under, and if this is done before much seed has been formed, after a year's fallowing (bare or green) followed by wheat, oats, maize or a similar crop, it will be safe to use the land for clover, lucerne or leguminous crops. If allowed to seed freely, the seed in the soil may not be exhausted for five or six years.

When small infested patches are found, a trench should be dug round the patch, over which straw or long chaff sprinkled with kerosene has been spread. After firing and burning off, the soil can be thrown over the quarantined area, covering and burning any parts which have escaped destruction. It is wise not to remove the infested plants for burning, as pieces left on the field or dropped in fresh places re-establish themselves and spread the evil. To attempt to tear out the dodder with a rake is even more foolish. Spraying with copper sulphate or iron sulphate solutions has been recommended, but a badly infested crop cannot be saved in this or any other way. It is better to lose completely a small area of the crop by burning than to risk a much more serious infestation next year.

Care should also be taken to use only clean seed. Indeed, the sale of seed containing dodder should be a severely punishable offence.

Infested clover or lucerne should not be fed to stock, as seeds may be voided unaffected in the manure, and reinfect new ground. Above all, good cultivation in the widest sense should prevail, and all fields, hedges and ditches should be kept clean and free from weeds, especially leguminous ones. Dodder also grows on St. John's Wort and other weeds but usually not on Compositæ. It has recently been found doing serious damage to potatoes.

Several native species of *Cassytha* (Lauraceæ) are often mistaken for dodders which they closely resemble in habit and external appearance, and are called scrub or bush dodder. They mainly grow on native plants, herbs, shrubs or even trees, especially near the sea, but are not agricultural pests like the true dodders, though like them they have no assimilating leaves, and obtain food from the host plants on which they grow by means of their attaching suckers.

Cassytha is a coarser plant than the true dodder (*Cuscuta*), the fruits larger, less fleshy, not as densely clustered and each one enclosed by a closely investing calyx barely open at the top.

The common introduced dodder (*Cuscuta epithymum*, L.) is proclaimed for the whole State (June, 1908).

Convolvulus arvensis, L. Bindweed. A perennial with annual twining stems, arrow-shaped leaves, and rather pretty pinkish flowers. The plant is one of the later introductions, and is very troublesome in cultivated ground. Its twining stems choke the plants to which it attaches itself, and its creeping underground stems render it difficult to eradicate, since quite small pieces will start fresh growths, and the stems are often a foot below the surface. The weed is especially troublesome in light friable soils and in corn crops. Badly infected land should be deeply ploughed, and the underground stems harrowed or raked out. Where patches are present they should be forked out. The free use of the hoe in spring, and the growth of a leafy fodder or a root crop well encouraged by manure, will help to keep down the plant and prevent its flowering.

The seeds have a very prolonged vitality in the soil, and hence the prevention of flowering and seeding is very important. ☞ The plant is less mechanically dangerous on pastures, but the leaves are bitter, the underground stems purgative and the seeds (four in each rounded capsule) are poisonous to stock if eaten in any quantity. Rotation farming, coupled with occasional bare fallowing, aids in keeping down a weed of this kind. Great care should be taken to avoiding introducing it with impure seed, as has commonly occurred during the past. Its dark, somewhat triangular, and roughened seeds are easily recognised. When ground in flour they spoil its colour, and render it injurious if present in any quantity.

Proclaimed for the whole State, June, 1908.

ASCLEPIADACEÆ (ASCLEPIAS FAMILY).

A small order of plants with milky juice often acrid or poisonous, and usually slender climbing or prostrate stems.

☞ *Gomphocarpus fruticosus*, R. Br. Introduced from South Africa. It is spread throughout the warmer regions of the globe and is an exceedingly variable species, but of little economic value. The hairs of the fruit have been used for filling pillows, cushions, mattresses, &c., as a substitute for kapok, but the quantity in each pod is small, and the fibre is too short and

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BINDWEED.

(Convolvulus arvensis) L.

brittle to have any other use. The plant has no value as fodder and is in fact injurious to stock if fed to them, even when mixed with other food. A fibre can be obtained from the stem, but it is too difficult to clean for its preparation to be profitable. The milky juice is feebly poisonous when taken in quantity and brings on sickness. The leaves are sometimes used as a substitute for Senna, and the plant is the Arghel of Syria. It is easily suppressed by cultivation or by cutting to prevent seeding on pasture land. The seed appear to have only a limited duration in the soil, and so far the plant does not seem likely to become a serious pest. The hair-bearing seeds are carried long distances by the wind.

☞ *Sarcostemma australe*, R. Br. The Caustic Vine or Bush. This plant reaches the warmer parts of Victoria and is generally considered to be highly poisonous to stock when taken in large quantities. They only touch it when starved, and may then become accustomed to eat large amounts for some time without suffering to any extent. The young shoots of several exotic species are edible, and it is possible that the poisonous properties of our native species have in many cases been exaggerated.

SCROPHULARINEÆ (FOXGLOVE FAMILY).

The superior ovary is two chambered and the stamens two or four in number, a fifth stamen often represented by a staminode.

A fairly large order useless for fodder, and containing hardly any edible species. Many are poisonous, others are bitter or act as emetics or purges. A few of the order are parasitic on the roots of grasses and hence do serious harm to pastures.

Bartsia latifolia, Sibth. This naturalized annual has proved to be a pest in some places. It seeds freely and the seeds may remain living in the soil for a few years, coming up in abundance in favourable seasons. The plant seems able to develop without being parasitic on grass roots, but nevertheless its presence does not improve either pasture or fodder. Two other species have appeared.

B. viscosa, L., and *B. Trixago*, L. All three are often sent in as suspected poison plants, but they do not appear to be actively poisonous. If eaten in excess, however, they cannot fail to exercise a more or less injurious physical or even chemical action, and in any case their presence deteriorates a pasture. Like many annuals they are sporadic, being more abundant in some seasons, than in others. Mowing to prevent seeding, resting the pasture in spring, loosening and manuring the soil all aid in keeping them down. Cultivation soon suppresses them.

☞ *Digitalis purpurea*, L. Foxglove. A garden escape sometimes appearing as a weed, but not abundant. It is strongly poisonous, but stock apparently do not touch it on account of its bitter taste. In England, the plant is common on the edges of pastures without any evil results appearing to ensue. The plant is a biennial, and hence is best suppressed by hoeing up the root-stock before flowering.

Linaria Elatine, Desf. Toadflax. A native of Europe and Asia. One of the more recent introductions, which though only an annual may become troublesome if allowed to spread. It has a strong bitter taste and is useless as a fodder plant. It is easily suppressed by cultivation and the prevention of seeding.

Gratiola.—Three species are native to Victoria, and all appear to have a purgative action capable of producing serious consequences when the plant is eaten in quantity. *G. peruviana*, L. appears to be the commonest form, but no exact experiments have been performed, and no active principle has been extracted and tested.

Verbascum Blattaria, L. Moth Mullein. Introduced from Europe, Asia and Africa, with agricultural seed. It is now fairly widely spread, but does not seem to have done much harm. It has a somewhat unpleasant smell, and a strong bitter taste and is useless as fodder. It has more than once been suggested as a possible cause of death in stock but without any conclusive evidence being brought forward. The allied *Celsia Cretica* has also appeared and is somewhat similar in character.

Among the Scrophularineæ parasitic on the roots of grasses three native species of *Euphrasia* (Eyebright) are included. The European Eyebright (*E. officinalis*, L.) has not yet appeared. The Yellow Rattle (*Rhinanthus Crista-Galli*) and the Cowwheat (*Melampyrum arvense*, L.) are also parasitic on grass roots. The seeds of the latter sometimes make rye flour injurious, and have the same injurious effect on beer when present in abundance in barley used for brewing. *M. pratense*, L., the Meadow Cowwheat, is similar, but is not parasitic. All these plants and their allies will ultimately appear in this State unless stringent control is exercised over the introduction of new plants and weed seeds.

MYOPORINEÆ (MYOPORUM FAMILY).

These resemble the Scrophularineæ somewhat in their flowers, but are shrubs or small trees, and with only one to four seeds in each cell of the fruit, instead of the numerous seeds characteristic of the Scrophularineæ. With the exception of one genus, this order is entirely Australian, and has only a very slight economic importance, the timber being of comparatively little value. A West Indian species yields oil, and gummy or sugary exudations from some Myoporums have been used as food by the blacks. ☞ At least two species are suspected of poisonous properties but no experimental information is available in regard to either of them.

Eremophila maculata, F. v. M., is occasionally given the misleading name of Native Fuschia. The plant appears to have a certain fodder value but to be dangerous when eaten in quantity by starved stock, especially if weakened by travelling.

Myoporum deserti, A. Cunn. The Dogwood Poison bush. This is supposed to be poisonous when in fruit, but the symptoms are vague, and no poisonous principle has been extracted.

THYMELACEÆ (PIMELEA FAMILY).

Petals none, sepals petaloid, stamens two or more, fruit with a single seed. Several species of *Pimelea* are recorded by Bailey as poisonous but on suspicion only and there is an entire lack of scientific evidence in regard to them. *P. pauciflora*, R. Br., and *P. simplex*, F. v. M., grow in Victoria. The statement that the life of a sheep supposed to be poisoned by *Pimelea* may be saved if its ears are slit is a common superstition in regard to the treatment of stock supposed to be poisoned, and like many other superstitions is the cause of a good deal of unnecessary cruelty. A lethargic sheep is naturally more lively for a time after its ears have been slit, and the fact that it ultimately dies is put down to the "cure" not having been applied soon enough. According to Mr. Maiden, *Pimelea linifolia*, Sm., which is widely spread in New South Wales, is quite harmless.

BORAGINACEÆ (BORAGE FAMILY).

Herbs with usually blue, yellow, or white, regular, five partite flowers. and the ovary divided into four little nutlets. This comparatively small order includes few plants of economic value, although dyes are obtained from some, and others have a slight food value. Several are troublesome weeds.

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PATERSON'S CURSE.

(*Echium vulgare*, *Linné*.)

Amsinckia angustifolia, Lehm., is an introduction from Chili which appears to be spreading in the Ararat, Bungaree, Horsham and Woodend districts. It is easily suppressed by cultivation, cutting and hoeing.

Borago officinalis, L. The Common Borage. This is a Mediterranean plant brought to this State with impure agricultural seed, but not yet abundant. It is a rough hairy annual or biennial with blue flowers, apt to spread in waste ground, and sometimes cultivated in gardens. Young shoots have been used in salads, and the plant collects potassium nitrate from the soil, often to a considerable extent. Hitherto, it has not proved a serious weed and is easily kept under by the prevention of seeding.

Echium violaceum, L. Viper's Bugloss. A European introduction which is supposed to have been brought to the State by a settler named Paterson and which has increased so much in the Shire of Towong as to be proclaimed for that Shire, where it is known as Paterson's Curse. It is a coarse biennial with purple or blue flowers, sometimes almost perennial and then especially troublesome on natural pastures. Close cutting suppresses it in time, but it is cheaper in the long run to root the plants up, pile and burn them, and then keep the land under cultivation with root crops and fallow until all the seed in the soil is exhausted, which apparently takes some years.

An annual or biennial; stem one to three feet high, erect or ascending, diffusely branched. Radical leaves lanceolate, stalked, the stem-leaves spreading obtuse, cordate and sometimes dilated at the base. Flowers showy, dark blue-purple, in numerous one-sided spikes forming a long terminal curved panicle, corolla often an inch long; the narrow part of the tube very short, spreading into a broad campanulate throat, with a very oblique limb, the lower lobes rather longer than the longest stamens.

An introduction from Southern Europe. It is not poisonous to stock, and is considered to be a very fair pasture plant in its young state, but when the plant matures, the flower-stalk is very rough and hairy, so that stock do not touch it, and when it seeds and dies off, all the grass is killed underneath, hence the ground is left quite bare.

Proclaimed for the Shires of Towong (1904) and Maldon (1908).

Lithospermum arvense, L. The Corn Gromwell. A small erect, usually greyish, annual with small white flowers. It was introduced from Europe with impure seed-cereals, and is fairly common in corn-fields as well as in waste places. It is not a serious weed and is easily kept down by good cultivation, coupled with rotation farming, but if neglected in wheat fields grows up and smothers the young wheat plants.

LABIATÆ (DEADNETTLE FAMILY).

This rather large and homogeneous order contains no poisonous species but many useful ones used in cooking on account of their aromatic flavour, or as a source of perfume. The order is easily recognised by the opposite leaves, square stems, flowers with lower and usually with an upper lip, four stamens (rarely two), and the fruit divided into four little nutlets. The leaves of a few, as for instance *Prunella vulgaris*, L., have a slight fodder or food value (salad or vegetable) when young, but most are too bitter or aromatic. A little in hay is not serious, but an excess is in all cases to be avoided. The plants are usually perennial herbs occasionally shrubby, but even those with creeping underground stems are usually easily kept under. In some cases, the seeds have a very prolonged vitality in the soil.

Hitherto only two labiates have shown any signs of becoming pests.

Salvia verbenacea, L. The Wild Sage. A native of Europe and Asia. This is a useless perennial, which appears to be spreading in parts, especially on rather poor, dry soil in exposed situations, though it can also enjoy moisture. The plants need to be rooted up, piled, and burnt, before seeding has taken place. It does not thrive on cultivated land, and is quite useless as a fodder plant.

Marrubium vulgare, L. The Common Horehound. A native of Europe, Asia, and Africa. This is a tall perennial herb with rather thick, woolly stems, one to two feet high, wrinkled, rounded, stalked leaves and dense clusters of dirty white flowers among the upper leaves, the calyx hairy, and with ten small hooked teeth, which aid in the dispersal of the ripe fruits by passing animals. It has a bitter taste, is useless for fodder or grazing, but is not poisonous. The plant has a pleasant, somewhat musk-like smell, and an extract (Marrubin) is occasionally used for chronic catarrh, &c. It is not worth cultivation, and though a weed in all countries where it grows was included by Mueller in the *Select Plants*. "Its naturalization can nowhere be unwelcome, as it does not unduly spread, as it has important medicinal properties, and as the flowers through much of the season afford to bees nectar for a pale, excellent honey." The plant has, however, spread to such an extent in the Warrnambool district that, at the request of the shire authorities, it was proclaimed a weed under the Thistle Act for that district in 1905. Cutting helps to keep it down in pasture land, but to thoroughly clean badly affected land it must, if possible, be brought under the plough and subjected to fallowing, followed by root crops.

Proclaimed for the Shires of Maldon (1908) and Warrnambool.

Mentha Pulegium, L. The Pennyroyal Mint. A native of Europe, Asia, and Africa. It is a small perennial, quite without value as a fodder plant, and apt to overrun moist ground. Cultivation easily keeps it under, and on pastures, drainage and liming have the same effect, as in general the plants thrive where water is abundant and nitrification is at a low ebb.

Stachys arvensis, L., the Field Stachys, and *Lamium amplexicaule*, L., the Henbit Dead Nettle, are two small annuals introduced from Europe, which have spread to some extent, but are not in any way serious. Both are small plants, the latter more especially being branched and decumbent at the base. Both have purplish flowers, the corolla in the former barely projecting beyond the rather long calyx teeth, but in the latter the calyx teeth are shorter and the corolla longer. *Stachys* is very commonly accused of being poisonous, but on entirely false evidence.

No member of the genus *Stachys*, or of the natural order to which it belongs, is known to be definitely poisonous, although the order includes no less than three thousand species, and the genus over two hundred. A widespread superstition exists that this plant, so common in Europe and England, where it has been regarded from time immemorial as harmless, is responsible in Australia for causing the disease known as "staggers," and various poisoning symptoms. The explanation is that some ignorant person corrupted the name *Stachys* weed into Stagger weed, and thence by association of ideas the plant was held responsible for the disease. So deeply impressed is this superstition that we find a competent botanist accepting the poisonous character of *Stachys arvensis* as definitely established.

PLATE 21.

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COMMON HOREHOUND.

(Marrubium vulgare, Linné.)

APETALÆ.

POLYGONACEÆ (DOCK FAMILY).

A small but widely spread order, including a few economic species, *Rheum* (Rhubarb), *Polygonum Fagopyrum*, L. (Buckwheat), but no poisonous ones, and a few troublesome weeds (Docks, &c.). The leaves of many species are more or less acid, and the stems and roots usually bitter. Hence the plants are useless as fodder or grazing plants. Usually herbs, with sheathing stipules at the knots on the stem; flowers small and clustered; perianth, four to six partite, enclosing the seed-like, usually triangular, nut. Flowers usually small, perianth simple or apparently simple, or none.

Rumex crispus, L., *R. conglomeratus*, L., and *R. obtusifolius*, L., are the commoner Docks, and all have a fruiting perianth of six segments, the three inner ones enlarged. Natives of Europe and Asia. These tall perennial weeds are not easily got rid of, especially on undrained and on pasture land. The seeds are not carried any distance by the wind, although the one-seeded fruits are more or less winged in some species, but are usually introduced with impure clover or grass seed. They flower readily, and produce an abundance of seed, which may lie dormant a few years in the soil. Any part of the long tap root, when cut, may form buds, and thus new plants.

Hence, for eradication the ground must be ploughed, harrowed, horse-raked, the pieces of root collected after each operation, piled in heaps or pits, covered with quicklime, and next year used as manure, if all are dead. The land must be kept under good tillage and root crops until clean. Great care should be taken when sowing down again to use only pure grass and clover seed. The triangular brown shining seeds of the ordinary dock are easily recognized.

Young Dock leaves can be used as a coarse kind of Spinach, but the fodder value of the plant is practically "nil." Darwin (*A Naturalist's Voyage round the World*, p. 513), noted in 1835 that "the common Dock is also widely disseminated (in New Zealand), and will, I fear, for ever remain a proof of the rascality of an Englishman who sold the seeds for those of the Tobacco plant."

R. Acetosella, L., the Sheep's Sorrel, and *R. Acetosa*, L., the Sorrel, are both small annuals from Europe and Asia, with bright green acid leaves often turning red when older. The former was established as far back as 1802, and likes dry open places, but the latter, which prefers moist pastures, has not as yet been recorded. The young leaves have been used as a vegetable, but their acidity, due to the presence of acid oxalate of potassium, renders them unsuitable for this purpose or as fodder plants. These plants seed freely, and can only be kept under by good cultivation when once allowed to develop and flower unchecked and in abundance. They thrive less in well-opened, aerated, and limed soil, and are kept down by the larger grasses and clovers.

Polygonum. In this genus the flowers have a perianth of five segments. *P. aviculare* L., Knot Weed, Knot Grass, or Hog Weed is a small, wiry annual prostrate on open ground, but erect and a foot or so high when growing among other vegetation. Its small white-tipped flowers are clustered in the axils of the leaves, which have a white membrane sheathing the stem at their bases. The triangular seeds are not shiny, but extremely minutely roughened. They form a common impurity among agricultural seed, and it was in this way that the plant was originally introduced to Victoria. The plant is now spread over nearly the whole world. The seed lasts for some time in the soil, and soon ripens on the plant. Hence,

the weed can only be kept down on badly infested land by continually working the soil, or keeping it covered with leafy vegetation. Among corn the plant thrives and readily ripens and sheds its seed. The addition of lime to the soil (½ to two tons per acre) usually aids in suppressing it.

The plant is not poisonous, and even has a slight value during a part of the year as fodder for grazing stock, but on all ploughed land it is a great nuisance, though hardly a dangerous pest.

P. Convolvulus, L. The Black Bindweed, or Climbing Buckwheat. This plant in its leaves and twining stems resembles the true Bindweed, but is much less objectionable, being an annual with a fibrous and not a rhizomic root. The short membranous stipules sheathing the stems at and around each leaf base, the small greenish flowers in loose axillary or stalked clusters, and the brown or black triangular but not winged fruits, each containing a single seed, readily suffice to distinguish this plant.

It often grows among corn, being introduced with the grain. It may strangulate the plants round which it twines, and once established is hard to suppress, especially on stiff soil, since the seed appears to last for some years in the ground. Bare fallows, clean tillage, and the use of pure seed are the only remedies.

AMARANTACEÆ (AMARANTHUS FAMILY).

A small order, a few having a slight use as vegetables or as decorative plants, but none being either poisonous or of special economic value.

Amaranthus Blitum, L., *A. albus*, L., and *A. retroflexus* L. (Prince's Feather, Love-lies-a-bleeding, &c.). They seed freely, and are mostly found near houses, possibly as garden escapes, but are apparently not to be dreaded. The lastnamed species appears to be the most troublesome, but has a slight fodder value.

CHENOPODIACEÆ (THE GOOSEFOOT OR SALTBUSH FAMILY).

This order is close to the preceding one, but has two or three small bracts under each flower. Usually the perianth has five segments, stamens five, ovary single, with two or three styles. Herbs or under-shrubs, the perianth often enlarged after flowering. It is a widely spread order, not poisonous, but including a few useful plants for food or fodder (Spinach, Beet, Saltbush), and several troublesome weeds. Many species are adapted to growth under dry conditions or in saline soil (*Atriplex*, *Suaeda*, *Salicornia*, &c.), and some of these species afford valuable fodder plants for dry or saline districts.

Among the native species, three cosmopolitan *Chenopodiums* are included, which are almost useless as fodder, and apt to become troublesome weeds if unchecked. These are *Chenopodium glaucum*, L., *C. murale*, L., and *C. album*, L., the Glaucous, Nettle-leaved, and White Goosefoots respectively. The lastnamed is sometimes termed Fathen or Lamb's quarters, and is particularly troublesome on arable land kept in good heart, especially among root crops and potatoes. The plant is easily recognised by its mealy appearance, small green flowers, and shiny black seed, shaped something like a flat ink-pot. The seed may remain dormant in the soil for many years, and hence any of the weed that has escaped destruction by careless working and hoeing should be hoed or hand-pulled before flowering. Its tiny black seeds are a common impurity in agricultural seeds.

Chenopodium ambrosioides, L., the Mexican Tea, is now an abundant and widely spread naturalized alien, and was present as far back as 1802.

It has a pleasant aroma but is a useless cosmopolitan weed. The French peasants value it as a herb tea. It seeds freely but can be kept down by good cultivation.

Chenopodium (*Roubieva*) *multifidum*, L. has recently appeared, and is a native of South America, whence it has spread as a weed into North America, and thence reached Australia.

EUPHORBIACEÆ (SPURGE FAMILY).

A large and widely spread order, characterized by reduced unisexual flowers—*Mercurialis* (Dog's Mercury), *Ricinus* (Castor Oil)—often combined in little green flower-like clusters, surrounded by green glands (*Euphorbia*). In nearly all cases, the plants contain a milky sap, which in some species is intensely poisonous, but in others acts more or less as a tonic or purgative. Many yield oil (Castor Oil), used for various purposes, and the roots of some are used as food.

The Box (*Buxus*) and *Poinsettia* are often grown in gardens, the latter for its coloured bracts. One species of Manihot yields Ceara rubber, others yield Cassave bread or arrowroot, obtained from the fleshy roots after the poisonous principle in the sap has been driven off by heat or removed by washing.

☞ *Ricinus communis*, L. Castor Oil Plant. It is a garden escape, and has been known to act injuriously upon cows browsing upon it. Apart from the castor oil of the seeds, the plant, leaves, and oil cake contain a poisonous albuminoid, ricinin, in small amount. This substance is highly poisonous, causing agglutination of the blood, and the oil cake has been known to cause the death of horses. Nevertheless, both the leaves and oil cake are given in India to cattle as food, mixed with other fodder, and are supposed to increase the secretion of milk.

Euphorbia, a large genus of herbs and shrubs, many of the tropical species resembling cacti, and some species cosmopolitan.

Euphorbia Peplus, L. The Lesser Spurge. A small, weak annual, not poisonous, but often a nuisance in gardens, its seeds lying dormant in the soil for years, and coming up at intervals. It can be kept down by frequent hoeing and stirring. The plant is green, and has smooth seeds. *E. Peplis*, L., is similar, but often has a purple colour, is prostrate, and has not yet appeared in the State.

E. helioscopia, L. The Sun Spurge. A native of Europe and North Asia. It is a larger plant, whose green "flowers" face to the sun. It is also an annual, sometimes over a foot high, but usually less. Its green colour, size, and pitted seeds distinguish it from the first two species. It is a common weed of cultivated and waste places, very difficult to keep down, but not very serious on account of its comparatively small size, slender habit, and annual character. It is not appreciably poisonous, and is not as yet very common in Victoria, though it appears to be spreading.

E. Lathyris, L. The Caper Spurge. A native of Southern Europe. A tall plant, three feet high or more, with narrow leaves on the stem and wrinkled seeds. It is often cultivated in gardens, and is apt to spread thence to adjoining ground. Though not strongly poisonous, the plant acts as an emetic or purgative when eaten in quantity.

☞ Of the native Euphorbias, three species are commonly regarded as being poisonous to sheep, but one, *E. alsinæflora*, Bail., is not confieed to Northern Australia; the other two are undoubtedly not poisonous under ordinary conditions.

E. Drummondii, Boiss., is a prostrate small leaved form eaten by horses, cattle and sheep without injury. By itself it is, however, not a good pasture plant. Starved and travelling sheep are apt to suffer when tempted by its green colour to gorge themselves upon it. Hence may arise the statement that the plant is most poisonous in the early morning, less after a full day's strong sun, and still less when cut and partially or completely dried. As in the case of all indifferent or over-succulent pasture plants, an unlimited diet of it will accelerate the death of a weakly animal. The same applies to

E. eremophila, A. Cunn., but such plants, though not to be welcomed when too abundant, are not to be classed as poisonous plants any more than sand can be regarded as a poison because sometimes it binds a horse. Baron von Mueller gave these plants, especially the former, a bad reputation largely because of his inability to distinguish between popular superstition and scientific evidence. As long ago as 1886, it was shown that no poisonous principle could be extracted and that sheep could be fed on the plant without injury. (See Stanley in *Agricultural Gazette of New South Wales*, Sept., 1896.)

☞ The following have also been recorded as poisoning stock:—*Excæcaria Agallocha*, L., *Phyllanthus Gastroemii*, F.v.M., and *P. lacunarius*, F.v.M., but the evidence is quite unsatisfactory and the only species of *Phyllanthus* known elsewhere as poison plants are three tropical species (*P. Conami*, Sw., *P. piscatoria*, H.B.K., and *P. virosus*, Roxb.), employed by the natives in South America and the East Indies for stupefying fishes. Our native species need exact testing, for the branches and leaves of most species when eaten appear to exercise a diuretic action.

Beyeria viscosa, Miq., is regarded as poisonous in New South Wales.

Homalanthus Leschenaultianus (*Carumbium populifolium*, Reinw.), the so-called Native Poplar, was stated by Mueller to be the cause of hæmaturia in stock during dry seasons. Hæmaturia is more probably the result of the presence of a parasitic organism, and more good is likely to be done by providing stock ample supplies of clean, fresh water than by interfering with what appears to be a harmless shrub.

URTICACEÆ (NETTLE FAMILY).

A small genus mostly of stinging herbs, useless as fodder, though nettle tops yield a kind of spinach and nettle beer may be made from them. The stinging hairs inject formic acid into the skin. If the leaf is taken between the fingers, the hair is crushed before the point penetrates the skin.

Urtica urens, L., is the Small Nettle; a small introduced annual, with rounded leaves, easily kept under.

U. dioica, L., is the Tall Nettle, also introduced, and a perennial with creeping stems, which need to be forked out of the soil. Beating down and cutting exhausts the plant slowly, but if neglected the plant soon spreads again. Neither this plant, nor the native nettle, *U. incisa*, Poir., a similar plant with more deeply incised leaves, is as yet a troublesome weed. Like thistles and onion grass, they are plants which follow man, and occupy localities prepared by him for their reception. Nettles are usually commonest round dwellings, walls, waste places and rubbish heaps.

Trema cannabina, Lour. (Syn. *T. aspera*, Bl., *T. amboinensis*, Bl., *T. orientalis*, Bl.). The Hemp Kurrajong. The leaves were stated by Mueller to be poisonous, but extracts have proved to be innocuous. The leaves may act either as a mechanical irritant or block the digestive tract by their indigestible fibres. An occasional mouthful would then do no

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CAPE TULIP.

(Homeria collina, variety miniata, Sweet.)

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harm if mixed with softer food and hence the only precaution necessary would be to see that the stock were not starved when grazing where the plant was growing.

SANTALACEÆ (SANDALWOOD FAMILY).

A small order of herbs, shrubs or small trees, with small flowers, five perianth segments, five stamens and the ovary with a single seed.

Exocarpus cupressiformis, R.Br. The Wild Cherry. This is supposed to produce peripheral neuritis when fed largely or exclusively to stock and more especially to horses, and to act in the same way as the Darling Pea. The symptoms need investigation, however, and might possibly be merely due to digestive derangement and starvation, such as any horse would be likely to suffer from, if forced by hunger to eat the branches of any similar shrub. The green colour of these branches, like those of *Cytisus*, gives them a deceptive appearance of nutritious succulence which readily deceives man and sometimes even the more nature-skilled intelligence of horses and stock.

Monocotyledons.

Seeds with one or no cotyledon; herbs occasionally tree-like; parts of flower usually in threes.

IRIDEÆ.

A small order of herbs including several decorative and poisonous plants. The stem usually forms a hard, swollen, underground "corm," the flower has a six partite perianth, but only three stamens and an inferior ovary.

Sparaxis grandiflora, Ker-Gawl. This is an escape from gardens fairly widely spread, but hardly abundant as yet, and apparently not troublesome, although like the onion grass it might become a troublesome weed if neglected in pastures. Its flowers are rather showy and appear early in summer. It is an introduction from South Africa, and is not known to be actively poisonous or injurious, but its economic value is *nil*.

Sisyrinchium Bermudianum, L. and *S. micranthum*, Cav., are introductions from North America but not of any special economic importance.

☞ The former has been reported as poisonous to stock; also some cases of sheep poisoning from New South Wales (1903) appear referable to no other cause than the "Yellow Rush Lily" (*S. micranthum*). The name "Scour weed" generally applied to the plant is certainly suggestive.

☞ *Homeria collina*, Vent. The Cape Tulip. It has a swollen underground stem, three-quarters of an inch to one inch in diameter, with thick dark, brown latticed coats. The leaf is linear, stiff, one and a half to two feet long. Stem one foot to one and a half feet long, bearing one to four clusters of flowers; their bases are ensheathed by a membranous curled leaf, two and a half to three inches long. Floral leaves bright red, with a yellow throat inside, one and a quarter to one and a half inches long. Anthers and column each one-quarter of an inch long. Capsule club-shaped, an inch long.

The variety *miniata* of Sweet has a globose corm, with latticed coats. Lower leaves one to two feet, linear, rigid. Stem one foot to one and a half feet high, bearing several clusters of flowers. Spathes one and a half to two inches long. Floral leaves, golden, with a yellow stalk, three-quarters of an inch to one inch long, a quarter of an inch broad. Anthers shorter than the column.

This is a South African plant which has escaped from gardens and spread near the neighbourhood of Melbourne. The species includes several

varieties, the local form appearing to be the var. *miniata*, which is classed as a separate species in Baker's Irideæ. The plant often bears bulbils in the axils of its lower leaves, which aid in its spread. It has long been known as poisonous to stock in South Africa, and this has been confirmed by McAlpine and Farmer for Victorian conditions. No alkaloid has been extracted, but many of the Irideæ contain, especially in the bulbs, bubils or rhizomes substances resembling ethereal oils, which produce local or general inflammation of the mucous membrane of the intestine and stomach when taken in any quantity. The chief danger is when stock are suddenly transferred to new districts where the plant is growing. If they recover after eating it they usually avoid the plant in future, but this is of course no reason for incurring any such risk. The plant is easily recognised by its long flat sword-shaped leaves, often with bulbils, and its large expanded flowers, red to orange in colour, and with three (rarely two) stamens slightly united at their bases. The fruit is a dry dehiscent capsule, with numerous seed. Local patches should be dug up before flowering, the round "bulbs" with fibrous outer coats collected and burnt with the aid of brushwood, or destroyed in heaps with quicklime. In the former case the ash can be reapplied to the land with farmyard manure, or in the latter case the lime heaps directly applied after a time. Land much infested by the weed can only be successfully cleaned by two or three years' cultivation, as much ploughing and harrowing being given as can be afforded. The great thing with all bulbous plants is to disturb and expose them as much as possible while the land is being prepared for a crop, and to prevent flowering and food storage while the crop is growing. The crop itself then continues the suppression, and after harvesting care should be taken not to leave the land too long untilled if there is any danger of the pest developing new leaves and flowers.

Symptoms.—Flatulent colic followed by progressive paralysis. Mortality 20 to 50 per cent. in bad cases.

Treatment.—Hypodermic injections of ½-grain doses of physostigmine, and calcium chloride in half-ounce doses have been found useful.

Proclaimed for the whole State.

Romulea (*Trichonema*) *cruciata*, Ker.-Gawl. The Guildford or Onion Grass. This South African plant was called *R. Bulbocodium* (a native of the Mediterranean regions and Scilly Islands) by Baron F. von Mueller, and has been known as *R. rosea*, Eckl. (a native of South Africa), in New South Wales and Tasmania, but is easily distinguished from these species by its short style not projecting beyond the stamens, a character constant in several hundred flowers examined. *R. longifolia*, of Baker, is a synonym, and the Australian *R. cruciata* seems to have diverged sufficiently from the type form of *R. rosea* to be recognised as a distinct species.* Each shoot usually bears one or two flowers, but sometimes a single corm develops a cluster of shoots, and the plant then appears to be many flowered. The plant was abundant in the neighbourhood of the Botanical Gardens 40 or 50 years ago, but it has now taken possession of entire paddocks, roadsides and waste places, and like many bulbous plants it is difficult to eradicate.

Its pinkish purple flowers look very pretty among its green grass-like leaves in spring, as they open when the sun shines on them and close at night or in cold weather. The leaves appear in April or May, the

*Béguinot reduces our plant to a variety of *R. rosea* (var. *parviflora*), and revives the name *R. cruciata* for Jacquin's plant. As the relationship of *R. Bulbocodium*, *R. rosea* and *R. longifolia* is still in doubt, the name *R. cruciata*, Ker.-Gawl., under which our plant was proclaimed, had better be retained until finality is reached in this matter.

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ONION GRASS.

(Romulea cruciata) Ker-Gawl.

flowering begins in August, and usually lasts at least two months, the capsules continuing to ripen until November or December, before which time the leaves have died down. The seeds germinate mostly early in the following season when the soil is moist; some may retain their vitality apparently for a few years in the soil.

The ripe corms when crushed yield relatively large amounts of fine-quality starch. They are eaten by pigs and cockatoos, which in some parts have cleared whole districts more or less thoroughly.

Eradication.—The plant is a sun-loving one, preferring hard, dry, more or less bare, unshaded ground, vegetating in winter time and resting during summer. Poisons are utterly useless, as with nearly all weeds.

Cultivation soon suppresses it, winter wheat, followed by farmyard manure and potatoes, being especially good for the first two years; but a green fodder crop is equally good if it is up early in the year, and stands over winter. Fencing off and resting a portion of the pasture each winter will aid the grasses greatly in suppressing the weed. The treading of stock on wet ground is very bad for any pasture, if the soil is given no chance to loosen out and become porous again. The spread and damage done by this weed is mainly due to improper pasturage methods. All continually grazed and cropped pastures steadily deteriorate, especially when the practice is added of collecting and carrying away the droppings to cultivated land, instead of spreading the droppings and loosening the soil by the aid of scarifiers. Pasture land which is divided into paddocks by good wind-proof hedges, rested from time to time, enriched with humus instead of being robbed of it, and kept open and pervious by the use of scarifiers, will not be troubled by onion grass to any great extent, will have a less tendency to become tussocky, especially if occasionally mown, and will carry twice the amount of stock that one large paddock under continuous grazing would do. Further, the difference in carrying power will be even more pronounced in times of drought than in good seasons.

When the leaves are quite young, stock will browse on the onion grass, but they are not fond of it, and as soon as the leaves become adult they are so tough and wiry that the stock often pull up the sods, or draw out their own teeth. Statements are current that lambs eating the leaves become paralysed, and that cockatoos, after eating the underground corms, become stupified as with a narcotic, but the statements lack scientific confirmation, and appear to be based on scanty and not altogether trustworthy evidence. Experimental tests are needed.

Stock Roads and Waste Places.—The latter should wherever possible be covered with trees, preferably quickly growing and closely planted timber trees. The same applies to the former, except that in many cases closely planted acacias would be preferable. They suppress the weed completely, give shade and protection without overshadowing the road too much, yield useful products, bark, and wood, and add greatly to the beauty of the roads.

Lawns and Cricket Grounds.—Frequent and close cutting during the growing period, and as long as any flowers appear (May-October) will exhaust the underground corms, and prevent the formation of fresh seed. If the ground is trodden and baked hard by trampling in all weathers, it must be loosened, a top-dressing of well-rotted stable manure applied, and not rolled too heavily. *Romulea* does not like light, porous ground fairly rich in humus. It prefers ground which is dry in summer time but moist in winter.

Parasites.—A fairy ring fungus which forms brown irregular circles in the grass, also grows on and destroys the bulbs, but they soon reappear in the grass behind the rings, and the fungus does more harm to the

pasture than it does to *Romulea*. Loosening the soil, and the addition of lime aid in keeping down the fungus.

The plant is proclaimed for the whole State.

PONTEDERIACEÆ (PONTEDERIA FAMILY).

A small order, including one species native to Queensland and Northern Australia, but no Victorian representatives. An introduced species, the Water Hyacinth, has spread from Queensland, through New South Wales, to Victoria. The plant is a floating one, which has done serious harm in its home (Florida, &c.), and in its new home in Australia, by blocking up lakes, rivers, and water-courses.

Eichhornia speciosa, Kunth. (*Pontederia crassipes*, Mart.). The Water Hyacinth. A floating plant, the roots having a cap-like covering at the extremity. Stems very short, almost entirely immersed; the leaves roundish, but very variable in shape; leaf-stalks long or short, more or less inflated below the middle, with a sheathing scale at the base. Flowering axis from six to twelve inches long, with several sheathing bracts. Flowers, six to twelve, with a curved tube, pale-purple; the five lower segments nearly equal, the upper one larger, and marked with a yellow spot in a cloud of blue. Stamens inserted within the tube, three long, three short; filaments lilac, with numerous stalked glands. Anthers oblong; ovary tapering upwards into the style; stigma globular.

It is a native of tropical South America. The flowers are very beautiful, and, as it flowers freely, it has been widely cultivated. The plant is buoyed up by the air in the swollen bases of its fleshy leaves, the roots hanging freely in the water or attaching themselves to the mud at the sides of the water-courses or lakes. In warm climates, its rapidity of growth and multiplication is extraordinary, but even moderate cold checks it severely, and moderate frost injures or kills it. It is also very intolerant to salt, and hence soon disappears in tidal estuaries, even although masses continually float down with the stream from above. Old floating masses may accumulate so much debris as to block together across quickly flowing streams, especially where any natural obstruction occurs. The plants are, however, easily drawn off the surface by means of floating boards or rakes dragged to the side by ropes. The plant has been used for fodder, but is not of very much value in this respect, even for cows, and is quite useless for sheep or horses. It has also been used as manure, but is very bulky, and rots quickly, so that it only has a very slight and temporary value as adding humus to the soil. The spread of the plant has been favoured by its cultivation in artificial ponds, &c., for the sake of its bluish-purple flowers. The latter, however, fade rapidly when cut. It is only likely to prove dangerous in the warmer parts of Victoria, where it might prove a serious pest in irrigation channels, lakes, and water-courses.

Proclaimed for the whole State.

LILIACEÆ (LILY FAMILY).

Herbs, rarely tree-like (*Yucca*, *Dracæna*), with a six partite perianth; six stamens, and a superior ovary, forming, usually, a three-celled capsule. A large order, containing many decorative plants, a few useful as food (Onion, Asparagus), and some of the most poisonous plants known. These contain poisonous alkaloids. Thus, *Veratrum* contains the alkaloid Veratrin. No member of the order can be classed as a good fodder plant, and a few are troublesome weeds, difficult to eradicate on account of their bulbous underground stems on pastures, but all easily suppressed by cultivation.

Asphodelus fistulosus, L. This plant, known locally as the Onion Weed, is a native of Southern Europe. It has spread in certain districts,

WATER HYACINTH

Eichhornia speciosa Kunth

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ONION WEED.

Asphodelus fistulosus, Linné.)

doing serious harm to the pastures, and, like all bulbous plants, is difficult to suppress except by cultivation. Very much the same treatment applies as in the case of the Onion Grass, but the bulbs being larger and less numerous, are more easily removed from local patches by forking over, raking, and picking. These bulbs contain a good deal of sugar, and after washing and fermentation they have been employed by peasants in Europe as a source of alcohol by distillation. The plant does not appear to be poisonous or actively injurious, but is, nevertheless, quite unsuitable as fodder for ordinary stock. Pigs might, however, root up and eat the bulbs without injury. The plant has been proclaimed for the Shires of Bellarine, South Barwon, Port Fairy, Queenscliff, and Swan Hill, at the request of the respective Shire Councils.

Bulbine bulbosa, Haw., and *B. semibarbata*, Haw., are two native plants often called Wild Onion or Leek, of which the former is supposed to be poisonous, the latter a troublesome weed, especially in South Australia. The "poisonous" effect appears to be the result of a scouring action, such as an exclusive diet of raw or diseased potatoes will produce on pigs, cabbage on horses, or club-rooted turnips on sheep. The action is not necessarily the result of a direct poison. Both plants can be kept down by cultivation, manuring, and rotation farming.

Nothoscordum fragrans, Kunth., is another introduced weed, often called the Wild Onion, having broad, flat leaves and white flowers. This plant is a native of North America and Africa, and was introduced possibly as a garden plant some time ago. It has now established itself as a naturalized alien in the Western District, in many localities near Melbourne, and has also made its way into Pentridge. The plant bears radical leaves like those of a small leek, on long, upright stalks, and an umbellate cluster of greenish-white flowers, tinged with pink or purple, each cluster enclosed when young by two pointed membranous bracts. The pods are dark green and three-lobed at the top, six to twenty in each cluster. The white underground bulb has a somewhat onion-like smell, and is surrounded by dozens of small pointed bulbils, each of which can form a new plant. Hence, direct mechanical eradication is impossible. The plant can best be suppressed by cultivation and by the growth of leafy fodder or root crops. The ground must be worked well between each crop, so that the bulbils are not allowed to develop. Two years' treatment will be necessary to suppress it fully. Poisons are useless. The plant is not itself poisonous, but is useless for fodder, and a great nuisance on grazing land. The weed is likely to prove as troublesome as Onion Grass if neglected.

JUNCACEÆ (RUSHES).

The flowers usually occur in clusters, and, though small and scaly, closely resemble those of the *Liliaceæ*. A small order of no special economic value, useless for fodder, but sometimes of value for bedding, plaiting, and basket-work, &c. The plants prefer badly ærated, moist ground, but many will also grow on ground which is very dry for a part of the year at least. The Flat-leaved Wood Rushes (*Luzula*) are common in moist woods or on more open ground, but only the cosmopolitan *Luzula compestris*, D.C., is native to Victoria. The true Rushes (*Juncus*) are represented by twelve species, one of which, *Juncus bufonius*, L., the Toad Rush, is a cosmopolitan weed. Rushes are useless as fodder, and are best suppressed by drainage, liming, and cultivation. None are poisonous or aggressively injurious.

CYPERACEÆ (SEDGE FAMILY).

The sedges are grass-like plants with triangular stems, entire leaf sheaths, and the flowers in brown or dark coloured loose or dense clusters or spikes, separate male and female flowers in distinct or mixed clusters.

A rather large and widely spread order of little economic value, not including any poisonous plants, and characteristically inhabiting wet, marshy, or badly ærated soil, or ground which is very wet at some period of the year. None of the *Cyperaceæ* can be classed as good fodder plants, although in times of scarcity starved stock may get a little nourishment from their younger shoots. Most species can be kept down by drainage, liming, and by loosening the soil of the pasture by harrows or disc cultivators. The denser tufted forms need cutting from time to time; this and temporarily resting the pasture gives the larger grasses and fodder plants a chance to keep them down. Burning off does more harm than good, and if frequently repeated causes a steady deterioration of the land.

A few of the *Cyperaceæ* have so adapted themselves as to become troublesome weeds in almost any soil, and one of the worst is the cosmopolitan Nut Sedge ("Nut Grass"), *Cyperus rotundus*, L., so-called on account of its nut-like underground tubers, which render the plant very hard to eradicate.

Stem six inches to one and a half feet high, from a short, sometimes creeping, rhizome, the fibrous roots occasionally forming small tubers. Leaves flaccid, much shorter than the stems. Umbel rays not numerous, the outer leafy bracts seldom as long as the longest rays. Spikelets, very narrow, sharply pointed, varying from one to two and a half lines in length, three to eight together, in short spikes at the ends of the rays. Glumes numerous, overlapping, a narrow egg-shape, scarcely pointed, red-brown, with a green keel and light-coloured edge. Style long, three-cleft. Nut much shorter than the glume. The tubers of the allied *Cyperus esculentus* contain sufficient starch, oil, and sugar to be of use for food. The same applies to a lesser extent to the tubers of *C. rotundus*, which might be of value for pig food. They would, however, not pay to collect for this purpose, and pigs roaming freely in pastures usually put on little flesh, and often do much damage. Though not a good fodder plant, stock (horses and cattle) will eat it to some extent, especially when young. When fruiting, it is usually neglected, and even if the small, nut-like seeds are swallowed, they pass through mostly undigested, and germinate readily on the ground, thus spreading the evil. As in the case of most weeds, it is the seed which carry the plant from place to place, the tubers merely maintain it where it is once established, and only spread it very slowly.

The same modes of eradication apply to this plant as to the true Couch Grass (*Agropyrum repens*), discussed beneath, the only difference being that the tubers of the Nut Sedge are more easily left behind in the soil, so that, to avoid this, pigs might be allowed to root over penned portions of the field, after ploughing, harrowing, and raking the rhizomes and tubers together in heaps. They would then be more likely to put on plenty of flesh than if roaming freely and rooting for the tubers.

If the land is not to be ploughed, repeated cutting prevents seeding and exhausts the tubers, but to complete the exhaustion a close, leafy crop is necessary, which involves ploughing. Winter treatment is useless; the plant must be attacked during the growing period, and a bare fallow with the ground kept well stirred in summer, or as soon as rain has brought up fresh shoots or seedlings, has a wonderful cleansing effect. The plant is native to Victoria, and is a cosmopolitan, spread over the whole of the warm and temperate regions of the globe. It is a troublesome weed in both India and the United States.

Proclaimed for the whole State.

Records of *Cyperaceæ* poisoning stock are not wanting (*Schœnus apogon*, *Gahnia*, &c.), but the evidence is wholly untrustworthy, although a mechanical irritation or binding of the alimentary canal is quite possible

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NUT GRASS.

(Cyperus rotundus. Linne.)

as the result of eating large quantities of the rougher and tougher forms. Gahnia appears to contain an unusually large proportion of fibre and of ash, the latter often forming 9 to 12 per cent. of the dry weight.

GRAMINEÆ (GRASS FAMILY).

Flowers small, enclosed in chaffy scales, forming spikelets. Stamens three, rarely two or six; ovary single, superior, with usually two stigmas. Flowers usually bi-sexual, but sometimes uni-sexual (Maize, &c.), The grasses are the most important economic order of all plants, yielding more food and fodder products than any other group. It is only necessary to mention here such native or introduced grasses as are agricultural or horticultural pests, or are likely to become so. No definite poisonous alkaloid has hitherto been isolated from any grass, although some, when infested by fungi (ergot, &c.), become poisonous to stock. This applies especially to *Lolium temulentum*, L., the Darnel Grass, and *Paspalum scrobiculatum*, L., the Khoda Millet or Hureek of India, which is also native to New South Wales. Naturally, grain containing black ergot bodies is highly poisonous, and the broken grain sold for fowls often contains ergot grains, which the fowls may swallow with fatal effects. A comparatively small number of fresh ergot grains suffice to injure or kill a horse, cow, or sheep, and rusty straw and smutty grain are also injurious. Hence, suspected fodder should always be first examined for the presence of poisonous fungi. In addition, the changes induced by mould fungi in fodder or badly preserved silage often render it poisonous or highly injurious. Some grasses or grass seeds exercise a strong purgative action, which, in excess, may become dangerous. This applies to the rhizomes of *Bromus purgans*, L., and *B. catharticus*, Vahl., both natives of North America, which have not yet appeared in Victoria. Other grasses which, when young, are good pasture plants, become highly obnoxious when old on account of their barbed adherent seeds, which cause great injury and suffering, more especially to sheep and lambs. This applies especially to the genus *Stipa* and its allies.

Agropyrum (*Triticum*) *repens*, L. The True Couch Grass. This is one of the later introductions into Victoria, and seems likely, if neglected, ultimately to become one of our most troublesome weeds in agricultural land, as it is already in England. As in the case of Nut Grass, it is eaten by stock, but cannot be termed a good fodder plant, and if allowed to spread and seed freely, it rapidly deteriorates a pasture by suppressing better pasture plants. In pasture land, the larger clovers help to keep it and Nut Grass down, but if left too long the pasture can only be cleaned and improved by bringing it under cultivation for a time. The land should be ploughed in spring when fairly dry, and a heavy drag harrow run over it. Dry clods can be broken by running over a roller, smooth or corrugated, and followed by a light harrow. The rhizomes can then be raked in heaps and burnt when dry. If a heavy green winter crop is then put in, either at once or after a second working, the land will usually be much improved and comparatively clean. Like Nut Grass, the plant will grow in almost any kind of soil that is not absolutely sodden, or perfectly arid, but both plants are most difficult to remove from heavy, undrained soil. On such land, thick patches are best forked over before ploughing. Stacking a manure heap on the patch has been recommended for the same purpose, but it takes two years to suppress the weed, during which time the manure might be put to better use, instead of being allowed to waste.

On paths, the edges of fields, and waste places, the two weeds can be prevented from seeding by cutting, and forked out if too abundant, or if spreading into the field. Poisons are useless. The rhizomes may come up from a depth of three feet or more, and will bore through bulbs like

onions, or tubers like the potato, if these obstruct their path. Mr. Maiden quotes a correspondent as stating that the rhizomes were found thirty feet below ground by men digging a well. This is quite likely if someone had placed them there beforehand, or if they had fallen down the well shaft, but not otherwise. The statement is, in fact, based on as secure foundation as the equally exaggerated ones current in regard to the depth of penetration of the roots of St. John's Wort and other herbaceous weeds.

Two of the Bent Grasses (which are useful introduced pasture plants), often become somewhat troublesome in cultivated land, owing to their creeping rhizomes. They are, however, more slender, and less troublesome than Couch Grass, and have delicate branching heads of flowers.

Agrostis vulgaris, With., is the ordinary Bent Grass.

A. alba, L., is the Marsh Bent Grass or Fiorin.

The former is useful as an aid in reclaiming sandy soils; the latter is of special use for peaty, undrained, and rather wet soils.

Avena fatua, L. Wild Oat. A native of Europe, Asia, and Africa. A common annual weed among cereal crops, resembling oats, but readily distinguished by the brown hairs on the flowering glume enclosing the grain, and on its stalk. The seed are often present in impure grain samples, and once the plant gets in, it ripens and sheds its seed before the crop is ready to cut. The seed may last two or three years when deeply buried, but if near the surface usually germinate within one year. Its introduction should be avoided by the use of clean seed, and it may be suppressed by the aid of a well-cultivated root crop. If the land is very foul, it may be advisable to fallow and stir it for one season, destroying seedlings as often as they germinate in any quantity after rain, and to follow with a root crop or leafy fodder crop before grain is again sown. A hay crop cut early before flowering, also helps to suppress the weed. The plant was originally introduced with impure seed grain, and has spread and increased through neglect and continuous grain cultivation. Rotation farming aids greatly in suppressing it. Sometimes grown as a fodder plant!

Bromus. Several annual and biennial, or almost perennial, Brome grasses grow abundantly in Victoria, both as native and as introduced plants, and in pastures as well as in cultivated land. None of the species are good fodder plants, and most are troublesome weeds, whose seeds are widely distributed with impure seed of grasses and cereals. Once established, they are difficult to suppress, since the seeds ripen early, may pass through manure uninjured, and may retain their vitality for some years in the soil.

B. sterilis, L., the Sterile Brome Grass, a native of Europe and Asia, is the most objectionable. Its bearded heads are apt to cause internal inflammation, if eaten in any quantity. In early spring, while still green, it provides a bite for stock, but later on is left untouched, and in summer dies down, leaving the pasture without any feeding value. Scarifying the pasture, and the application of top-dressings of manure, will aid better grasses to keep it down. Clovers and trefoils are of use in suppressing it.

B. arenarius, Labill., the Sand Brome Grass, is a native of Australia, and is very similar in its properties.

B. mollis, L., the Soft Brome Grass, is a native of Europe, Asia, and Africa.

B. unioloides, L., the Prairie Grass, is a native of America. They are both introduced grasses, of which the latter more especially is of some value as a permanent pasture grass for dry regions. Many of the Brome grasses aid in carrying over rust fungi from season to season, and so infecting new crops.

Cynodon dactylon, Pers.. The Doub Grass, or Lesser Couch Grass. This grass is a cosmopolitan, of value as a pasture grass for dry, warm

districts, and sometimes used for lawns. In cultivated ground and gardens it is an unmitigated pest. The creeping stems grow horizontally when exposed to light, but in darkness grow upwards. Hence, even when buried one or even two feet deep, they may reach the surface, and there spread out again, and any piece of the stem with a knot may start a new growth. Good cultivation and frequent stirring, coupled with the aid of leafy fodder or root crops, keep it under, and in pastures kept in good heart it does not appear to increase unduly. It is essentially a weed of neglect, and is often one of the first plants to appear on bare ground.

Hordeum murinum, L. The Wall Barley. A coarse, tufted grass, introduced to Victoria from Europe, and now widely spread, and sometimes troublesome as a weed on lawns, where it forms unsightly spreading tufts with short barley-like heads when flowering. It has been stated to be poisonous when growing in pastures, and this might be the case when it was diseased and covered by certain fungi, but not otherwise. Nevertheless, it is practically useless as a fodder plant, and its bristly heads of flowers are obnoxious in fodder, and apt to cause irritation and injury to stock. On pasture ground kept pervious and in good heart, the better fodder grasses tend to suppress it. The plant is an annual, and dies down during the heat of summer, leaving the ground covered with its obnoxious, stalked, bristly heads of spikelets. Continuous grazing, trampling, over-stocking, and neglect favour its spread. The allied Meadow Barley, *Hordeum pratense*, Huds., is a taller plant, which favours moist ground, where it is usually perennial, and yields a certain amount of fodder while young. It is, however, nearly as objectionable as the preceding when in flower.

☞ *Sorghum.*—This useful fodder plant sometimes causes the death of stock. It develops prussic acid, occasionally in sufficient quantity to kill stock when the fresh fodder is eaten. The poison is usually developed as the result of injury by frost or other causes, and is especially likely to appear in young or stunted crops. The poison is volatile, so that the fodder becomes harmless when dried or fermented in the silo. Prussic acid occurs in many other plants also, either free or in the form of compounds, which, when eaten or fermented, will yield prussic acid (Bitter almonds, *Pangium edule*, Laurel, &c.).

Gymnosperms.

CYCADACEÆ.—Trees or shrubs, the seeds borne on carpellary leaves or scales, but not enclosed in an ovary. A small tropical or semi-tropical order, allied to the pines, and sometimes known as the "Palm Ferns," several species of which are grown in Victorian gardens. The fruits and seeds of several species are edible, and starch or arrowroot is obtained from the stems of some. ☞ The seeds of *Cycas circinalis*, L., and of *Zamia muricata*, Willd., appear to be distinctly poisonous.

☞ In New South Wales and Queensland several species of *Macrozamia*, and also *Cycas media*, R. Br., are supposed to produce partial muscular paralysis in stock (Wobbles), which have become fond of eating them. A poisonous resin has been extracted by Dr. Lauterer in Queensland from the leaves of Macrozamia, and this produced fatal gastro-enteritis when given internally to guinea pigs and cats. Animals fed with the plant showed similar symptoms. When small quantities are continually eaten, the usual chronic effects gradually ensue, which are grouped together under the head of "Wobbles" disease. It is possible that some of the symptoms may have some other accessory origin, or may be due in part at least to the indigestible character of the food swallowed.

CONIFERÆ.—These are all shrubs or trees, none of which can be classed as weeds, although some are poisonous. This applies to the leaves and

wood of the Yew, *Taxus baccata* (horses and cows especially), whereas its red berries are edible and harmless, as are the seeds of other Taxineæ (*Ginkgo biloba*, L., &c.). Many coniferæ yield resin or turpentine, and others valuable timber.

Cryptogams or Flowerless Plants.

FILICINEÆ (FERN FAMILY).

The Ferns include but few plants useful or injurious to agriculture.

Bracken Fern (*Pteris aquilina*, L., &c.), is a cosmopolitan plant. Several Victorian species of bracken often give the settler great trouble on newly-cleared bracken or scrub land. The spores are blown about by the wind, and are always present to start new plants when sufficient moisture is available. On pasture land, frequent cutting keeps them down, and pigs aid in rooting up and destroying the rhizomes (underground stems). Badly infested land can only be cleared by ploughing, harrowing, and raking off the rhizomes, and then planting potatoes. Good dressings of manure (farmyard with superphosphates and potassic manures) aid the crops to suppress the weed, and should be followed by a dressing with lime if the soil is deficient in that substance. If timber has been recently burnt on the land no potassium will be needed.

If the rhizomes are fully exposed on the surface, hot, dry weather will kill them, but not if they are partly buried. They contain a good deal of starch, but also a large amount of tannin, indigestible fibre, and mucilage, so that even after steaming they are not good food for stock. They may however, be chaffed in with other food, but do not form a good exclusive diet, even for pigs. The adult leaves are useless either for grazing or fodder, and although the young coiled leaves are more succulent, they contain too much tannin and mucilage to be at all palatable.

Bracken land is usually deficient in some one or more respects as regards the requirements of ordinary agricultural crops. It may be badly ærated, and needing loosening and drainage, or overcharged with or deficient in humus, and lacking nitrates, phosphates, potash, or calcium (lime). If the crop is to flourish, and not the bracken, the deficiency must be made good by drainage, ploughing, stirring, and manuring, the land being cropped and cultivated till clean. Then, if desired, it can be laid down in grass or clover, or a mixture of both.

The rhizome has been used roasted or ground as food, or mixed in bread, in Japan, Russia, and Europe, and an extract was formerly employed for diarrhœa and worms. It is an allied plant, however (*Aspidium filixmas*, Sw.), the extracted oil of which is the officinal specific for tape worm.

MOSSES AND LICHENS, though of great importance in the formation of soil, and as humus producers, have little or no immediate value to agriculture. Lichens (*Ramalina*, &c.) sometimes become so abundant on old trees as to injure or kill them. Cutting away infested branches helps to keep them down, and spraying with Bordeaux mixture (copper sulphate, 12 lbs.; quicklime, 8 lbs.; water, 100 gallons) is of some use. Young vigorous trees are rarely seriously affected.

ALGÆ.—Many of the green forms are often troublesome by fouling the water of tanks and ponds exposed to the sun. If the bottom of the pond is kept clean they give no trouble, and in moderate amount affect the purity of the water but little. Many forms (*Spirogyra*, &c.) are highly sensitive to sulphate of copper, but the additions of even small quantities of this poison to water intended for drinking is inadvisable. If it is used, quicklime should be added subsequently to aid in carrying down any copper sulphate remaining in solution after the algæ have been poisoned, but cleaning out the pond is a far more simple and effective remedy.

PART II.

CENSUS OF THE NATURALIZED ALIENS AND INTRODUCED EXOTICS OF VICTORIA.

Since the issue of Baron von Mueller's *Key to the System of Victorian Plants* (1887-8), which included a list of the plants naturalized in Victoria up to that date (pp. 531-536), very many additional plants have become naturalized, and have been recorded by Reader, Walter, and others in the *Journal of Pharmacy* (1887), and in the *Victorian Naturalist* at various dates. Since 1906 the records all originate from the National Herbarium, and are published in the *Victorian Naturalist* and in the *Journal of the Royal Society of Victoria.* It has already been pointed out that, owing to the absence of a full list, the same record has in some cases been repeated more than once as a new one, and that the naming has not in all cases been correct. In addition, a number of well-known fodder plants have long been established on a permanent basis, without being definitely recorded. A full and complete list is obviously useful, and in order to avoid repeating the confusion of the past every naturalization record to be found in the literature on Victorian plants has been indexed, and an alphabetical list formed, giving the date and place of the first published record of naturalization (fourth column of list). Considerable difficulty has been experienced in many cases in determining which was the first record of naturalization, since many plants have been recorded as naturalized on their first appearance, or when merely garden escapes, and some of these have succeeded subsequently in establishing themselves, but others have not. The decision has been made with the aid of the materials at the National Herbarium, and no effort has been spared to make it as accurate and as just as possible. The addition of the later records and unrecorded plants, as well as the local distribution and original home of each plant, will enable us to take a general view of the source and spread of our alien flora, while the last column of the list shows the character of the plants in question. The rapid spread and increase in numbers of our naturalized aliens is remarkable. Thus in Bentham's *Flora Australiensis* a total of 99 are recorded (1863-1878). In Mueller's *Key to the System of Victorian Plants* (1887-8), 51 additional names are recorded, and an additional fifty records are due to Reader in the *Journal of Pharmacy* about the same time. So that the list was more than doubled in a little more than ten years. Many of these would, however, be records of plants omitted by Bentham in the absence of material evidence of their establishment in Victoria.

The total number on the present list is 364, so that the increase during the past thirty years is nearly at the rate of one plant naturalized every

two months, and approximately the same rate of increase has been maintained since 1850. Many of these aliens now occupy large stretches of territory, and form characteristic features of the flora, having largely ousted the original native occupants. About one species out of every six or seven is an alien plant, and in the more closely settled districts the number of individual alien plants per acre, even on pasture or uncultivated land, is usually greater than that of natives. Our forests, on the other hand, are almost solely composed of native trees, although a few alien herbs and shrubs have crept into the undergrowth. The character of the plants which are replacing our native flora in this way is naturally of great importance, and unfortunately a large number are highly obnoxious in character. Thus, out of the 42 plants which have been proclaimed for Victoria under the *Thistle Act* on account of their obnoxious or poisonous character and rapid powers of multiplication, only five are native plants, and 37 are introduced ones, mainly Composites. Out of the 364 naturalized aliens, about 220 are useless and more or less troublesome weeds, both in pastures and in cultivated ground. Of the remainder, approximately 55 have a slight value as fodder plants, especially on poor, dry, sandy, or undrained soils, and a small number are hedge and garden plants, which, when unchecked, run wild and become troublesome. The rest of the list is made up of really useful pasture plants, grasses, clovers, &c., to the number of 32, which have been introduced, and have succeeded in establishing themselves. Of our obnoxious aliens, a few appear to have been introduced by well-meaning individuals devoid of the requisite knowledge, but the great majority are "accidental" introductions with imported fodder, ballast, packing, and impure agricultural seeds. It is to be regretted that, until recently, no control has been exercised over the introduction of imported seeds, which is one of the most fertile sources by which obnoxious plants are introduced, as impurities in agricultural or garden seeds. On the whole, therefore, our acclimatization record for the past 50 or more years is a bad one, and leaves much room for improvement in the future.

In regard to the orders most strongly represented among the introduced alien flora naturally Compositæ, Leguminosæ, and Gramineæ come first, but owing to the fact that many of the introductions are purposeful ones of useful grasses and other fodder plants, the number in each order differs from what it is in nature. Gramineæ is represented by 88 species, Compositæ by 53, and Leguminosæ by 40. The orders next in importance are: Cruciferæ (21), Caryophyllaceæ (15), Labiatæ (12), Scrophularinæ (11), Irideæ (10), Umbelliferæ and Polygonaceæ (9 each), Solanaceæ (9), Chenopodiaceæ (7), Malvaceæ and Rosaceæ (6), Papaveraceæ, Geraniaceæ, Amarantaceæ and Ranunculaceæ (5 each), Ficoideæ, Boraginaceæ and Euphorbiaceæ (4 each), the Fumariaceæ, Plantaginaceæ, and Convolvulaceæ are each represented by three species, but in the last-named order two of the three are proclaimed (Dodder and Bindweed). The following orders each include two naturalized aliens, Hypericineæ, Onagrariæ, Cucurbitaceæ, Rubiaceæ, Primulaceæ, Apocynaceæ, Verbenaceæ, Urticaceæ, Liliaceæ, Juncaceæ, while the Resedaceæ, Violaceæ, Polygalaceæ, Portulaceæ, Cacteæ, Valerianeæ, Dipsaceæ, Campanulaceæ, Asclepiadaceæ, Polemoniaceæ, Phytolacceæ, Pontederiaceæ, and Naiadaceæ are each represented by a single alien only.

Out of the 47 natural orders represented, the first three orders (Gramineæ, Compositæ, Leguminosæ) contain almost exactly half (180) of the total number of species, while the last 23 orders contain only 33 alien

species between them, and this in spite of the fact that some of the orders (Liliaceæ, &c.) are large and widely spread ones. A disproportion is shown, not only in the relative numbers of alien species, but also in regard to the orders which they compose. Thus the Gramineæ (true grasses) form about one-twenty-fifth of the total flora of Australia, whereas they form no less than one-fourth of the introduced flora of Victoria, and if all those plants are included, which are of greater or less value for fodder or grazing, the proportion is at least one-third. In other words, the pastoral phase from which agriculture in Victoria is just emerging has left its mark not only on the native, but also on the alien, flora. In the absence of any adequate power of check or control over their introduction and spread, the future is likely to see an increase in the number of weeds of cultivation, some of the worst of which have only reached us comparatively recently, while there are many more still to come.

Many of our alien weeds have reached us in an indirect manner, instead of coming direct from their original home. Thus, the Cape Weed reached us *viâ* Western Australia, the Water Hyacinth and Cactus *viâ* Queensland, the Stinkwort *viâ* South Australia, and the Shrub Aster *viâ* New South Wales. Many of our worst weeds of early days appear to have reached us *viâ* Tasmania, and we have to thank New Zealand for a good deal of our European Dodder, as well as for some other weeds.

The case of the Spiny Emex is especially interesting, since this weed, with spiny fruits, which are obnoxious in pastures, is a native of South and Western Australia, as well as of South Africa, and though now widely spread in Victoria and New South Wales, is not native, but has become acclimatized from the other States.

The name of Californian or Canadian Thistle for the perennial thistle indicates a popular idea as to origin, which is, however, incorrect. It is not a native of America, and reached Australia direct from Europe.

Excluding those of our aliens which are native to at least three continents, to the number of 157, or to two continents (taking North and South America as one) to the number of 67, the remainder mainly come from Europe (38). Thirty-two aliens are exclusively American, and mainly North American, while of the 27 aliens from Africa, most are from South Africa. The Mediterranean region, although it includes parts of three continents, is a very natural division in regard to floras, and 20 of our strangers are derived from this region. Only three of our aliens are exclusively Asian, and only two are derived from other parts of Australia.

It is very striking to note how the spread of weeds follows the great trade routes mainly traversed by British shipping, so that the well-known aphorism holds good in the form of "Weeds follow the flag." It is, again, only natural that the majority of our aliens should be widely spread, and not more than one-fourth originally restricted to single continents. A few of our naturalized plants are, however, of very limited range. Thus *Amsinckia* comes from Chili, *Avellina* from Italy, and *Lycium chinense* from China, but such cases are rare, and observations on the spread of such plants should be of interest. In the Transvaal the little burred amaranth known as *Alternanthera echinata* is called Khaki weed, and is said to have been introduced and spread in the Australian forage during the war, following the khaki clad host. *A. echinata* (*Achyrantha*) is however, a native of South America and does not grow in Australia, although other harmless species of the genus are native to this continent. In fact, the weed was probably in the Transvaal long before the war broke out.

NATURALIZED ALIENS OF VICTORIA.

(E.=Europe; As.=Asia; Afr.=Africa; Am.=America; Aust.=Australia; Med. reg.=Mediterranean Regions; Temp. reg.=Temperate Regions; Trop. reg.=Tropical Regions; N.S.W.=New South Wales; Qld.=Queensland; S. Aus.=South Australia; W. Aus.=Western Australia; Tas.=Tasmania. In the following list the original home is given in brackets in the sixth column.)

No.	Botanical Name.	Common Name.	Natural Order.	Date and place of first published record of Naturalization.	Local distribution and original home.	Character.
1	Achillea Millefolium, L.	Milfoil or Yarrow ..	Compositæ ..	Journ of Pharm., 1887..	General (E., As., & Am.)	A weed‡
2	Agropyrum* (Triticum) caninum, Beauv.	Fibrous Wheat Grass ..	Gramineæ ..	Vict. Nat., Vol. XXVI., p. 190, 1908	North-East (E.) ..	Of slight value as a pasture plant
3	Agropyrum repens, L. ..	English Couch or Quitch Grass	,, ..	Vict. Nat., Vol. XXVI., p. 190, 1908	General (Temp. reg.)	A bad weed in cultivated ground
4	†Agrostis alba, L. ..	White Bent Grass or Fiorin Grass	,, ..	Benth. Fl. Aust., Vol. VII., p. 576, 1878	General (E. & As.)	A fair pasture plant
5	Agrostis stolonifera, L...	Creeping Bent Grass ..	,, ..	Vict. Nat., Vol. XXVI., p. 190, 1908	General (E.) ..	,, ,,
6	Agrostis vulgaris, With.	Fine Bent Grass ..	,, ..	Journ. of Pharm., 1887	General (Temp. reg.)	,, ,,
7	Aira caryophyllea, L. ..	Silvery Hair Grass ..	,, ..	Benth. Fl. Aust., Vol. VII., p. 585, 1878	General (E. & As.)	More ornamental than useful
8	Aira minuta, Loefl. ..	Small Hair Grass ..	,, ..	Vict. Nat., Vol. XX., p. 14, 1903	North-West (E. & As.)	,, ,, ,,
9	Aira præcox, L. ..	Early Hair Grass ..	,, ..	Benth. Fl. Aust., Vol. VII., p. 585, 1878	General (E. & Am.)	,, ,, ,,
10	Albizzia lophantha, Benth.	Cape Wattle	Leguminosæ ..	Key to Vict. Pl., 1887–8	General (West Aust.)	Garden shrub
11	Alchemilla arvensis, Scop.	Alchemil or Parsley Piert, Lady's Mantle	Rosaceæ ..	Key to Vict. Pl., 1887–8	General (N. temp. reg.)	A weed
12	Alkanna lutea, D.C. var. parviflora	Yellow Alkanna ..	Boragineæ ..	Proc. Roy. Soc. of Vict., Vol. XX., p. 86, 1907	South (E.) ..	,,
13	Alopecurus agrestis, L.	Slender Foxtail Grass ..	Gramineæ ..	Key to Vict. Pl., 1887–8	General (E.) ..	Pasture plant
14	Alopecurus geniculatus, L. (Alopecurus fulvus, Sm.)	Marsh Foxtail Grass ..	,, ..	Vict. Nat., Vol. XX., p. 133, 1904	General (N. temp. reg.)	,,

15	Alopecurus pratensis, L.	Meadow Foxtail ..	Gramineæ ..	Key to Vict. Pl., 1887–8	General (N. temp. reg.)	Pasture plant
16	Alyssum maritimum, Lam.	Sweet Alyssum ..	Cruciferæ ..	Vict. Nat., Vol. XXIV., p. 15, 1907	South-West (E.) ..	A weed
17	Amaranthus albus, L.	Tumble-weed or White Amaranth	Amarantaceæ ..	Key to Vict. Pl., 1887–8	General (N. Am.) ..	A weed of cultivated and waste places
18	Amaranthus blitum, L.	Wild Blitum ..	,, ..	Vict. Nat., Vol. X., p. 145, 1893	General (Trop. & Temp. reg.)	,, ,, ,,
19	Amaranthus paniculatus, L.	Panicled Amaranth ..	,, ..	Journ. of Pharm., 1887	General (N. Am.) ..	,, ,, ,,
20	Amaranthus retroflexus, L.	Reflexed Amaranth ..	,, ..	Vict. Nat., Vol. XI., p. 34, 1894	,, ,, ..	,, ,, ,,
21	Amaranthus viridis, L.	Green Amaranth ..	,, ..	Vict. Nat., Vol. XXII., p. 79, 1905	General (Trop. reg.)	,, ,, ,,
22	Ammi majus, L. ..	Bishop's Weed ..	Umbelliferæ ..	Key to Vict. Pl., 1887–8	General (E., As., & N. Afr.)	A weed of cultivation plots and waste places
23	Ammophila arundinacea, Host. (Psamma littoralis, Beauv.)	Maram Grass ..	Gramineæ ..	Vict. Nat., Vol. X.,p. 145, 1893	Around sea coast (E. & N. Am.)	Useful for binding drift sand
24	Amsinckia angustifolia, Lehm.	Narrow-leaved Amsinckia	Boragineæ ..	Vict. Nat., Vol., X., p. 145, 1893	General (Chili) ..	A pest in cultivated ground
25	Anagallis arvensis, L. ..	Pimpernel, Shepherd's or Poor Man's Weather Glass	Primulaceæ ..	Benth. Fl. Aust., Vol. IV., p. 270, 1869	General (E. & As.)	A poisonous weed in cultivated and waste places
26	Andropogon erianthoides, F.v.M.	Satin-topped Grass ..	Gramineæ ..	Vict. Nat., Vol. XXIV., p. 190, 1908	North-East (N.S.W. & Qld.)	A useful perennial fodder grass
27	Andropogon halepensis, Sibth. and Smith	Johnson Grass or Haleppo Grass	,, ..	Key to Vict. Pl., 1887–8	General (E., As., & Afr.)	A pest in cultivated ground, but a useful fodder grass in permanent pastures
28	Anthemis arvensis, L. ..	Corn Chamomile ..	Compositæ ..	Journ. of Pharm., 1887	General (E. & As.)	A pest in corn fields
29	Anthemis Cotula, L. ..	Stinking Mayweed or Fetid Chamomile	,, ..	Key to Vict. Pl., 1887–8	General (E., As., & Afr.)	Proclaimed for two shires
30	Anthemis nobilis, L. ..	Common Chamomile ..	,, ..	Journ. of Pharm., 1887	General (E.) ..	A pest in corn fields and waste places
31	Anthoxanthum odoratum, L.	Scented Vernal Grass ..	Gramineæ ..	Journ. of Pharm., 1887	General (E., As., & Afr.)	Useful in mixed pastures

* Also spelt "Agropyron."—† Also recorded in Mueller's Key to Vict. Plants, 1887–8, as *Agrostis palustris*, Huds.—‡ Under the head of "Weed" all plants are included which have no recognised economic value, and which therefore may, under present conditions, be classed as useless or injurious to man.

No.	Botanical Name.	Common Name.	Natural Order.	Date and place of first published record of Naturalization.	Local distribution and original home.	Character.
32	Apera (Agrostis), spica-venta, Beauv.	Silky Apera	Gramineæ ..	Vict. Nat., Vol. XXIV., p. 190, 1908	North-East (E. & As.)	Of some slight value as a pasture grass
33	Arctium lappa, L. ..	Burdock	Compositæ ..	Vict. Nat., Vol. XXIV., p. 191, 1908	General (E.) ..	A pest in cultivated ground
34	Arenaria serpyllifolia, L.	Thyme-leaved Sandwort	Caryophyllaceæ	Benth. Fl., Aust., Vol. I., p. 159, 1863	General (E. & As.)	A weed of waste places
35	Argemone Mexicana, L.	Prickly Poppy ..	Papaveraceæ ..	Key to Vict. Pl., 1887–8	Widely spread (Am.)	A poisonous and troublesome weed
36	Arrhenatherum avenaceum, Beauv.	False Oat	Gramineæ ..	Benth. Fl. Aust., Vol. VII., p. 586, 1878	General (E.) ..	A perennial fodder grass: a pest on arable land
37	Asparagus officinalis, L.	Asparagus	Liliaceæ ..	Journ. of Pharm., 1887	General (E. &. As.)	A garden escape
38	Asphodelus fistulosus, L.	Asphodel or Onion Weed	,, ..	Vict. Nat., Vol. X., p. 145, 1893	Widely spread (E., As., & Afr.)	Proclaimed for six shires
39	Aster dumosus, L. ..	Shrub Aster	Compositæ ..	Proc. Roy. Soc. of Vict., Vol. XIX., p. 34, 1906	General (N. Am.) ..	A weed of cultivated and waste places
40	Atriplex hortensis, L. ..	Garden Orache ..	Chenopodiaceæ	Benth. Fl. Aust., Vol. V., p. 168, 1870	General (Cosmopolitan, cultivated)	,, ,, ,,
41	Atriplex patula, L. ..	Common Orache ..	,, ..	Benth. Fl. Aust., Vol. V., p. 173, 1870	General (N. & S. Temp. reg.)	,, ,, ,,
42	Avellina Michellii, Sav.	Michel's Avellina ..	Gramineæ ..	Vict. Nat., Vol. XXI., p. 172, 1905	Corio District (Italy)	Of very slight pasture value
43	Avena fatua, L. ..	Wild Oat Grass ..	,, ..	Benth. Fl. Aust., Vol. VII., p. 588, 1878	General (E. & As.)	A troublesome weed in cultivation paddocks
44	Avena pratensis, L. ...	Perennial Oat Grass ..	,, ..	Vict. Nat., Vol. XXIV., p. 191, 1908	Widely spread (E., & N. As.)	Of very slight fodder value
45	Avena pubescens, L. ..	Hairy Oat Grass ..	,, ..	Vict. Nat., Vol. XXIV. p. 191, 1908	Widely spread (E. & N. As.)	,, ,, ,,
46	Bartsia latifolia, Sibth...	Common Bartsia ..	Scrophulariaceæ	Key to Vict. Pl., 1887–8,	General (E., As., & Afr.)	Injurious to pastures
47	Bartsia Trixago, L. ..	Trixago Bartsia ..	,,	Vict. Nat., Vol. XXIV., p. 68, 1907	Broadmeadows (E. & Afr.)	,, ,,
48	Bartsia viscosa, L. ..	Sticky Bartsia ..	,,	Vict. Nat., Vol. XX., p. 164, 1904	Widely spread (E. & Medit. reg.)	,, ,,
49	Bellis perennis, L. ..	Perennial Daisy ..	Compositæ ..	Vict. Nat., Vol. XIX., p. 50, 1902	General (E.) ..	A weed when growing wild

50	Berkheya(Stobæa) rigida, Thunb.	African Thistle ..	,, ..	Proc. of Roy. Soc. of Vict., Vol. XXII., 1909	Port Phillip (S. Afr.)	A troublesome weed
51	Beta vulgaris, L., var. maritima (Beta maritima, L.)	Wild Beet	Chenopodiaceæ	Proc. Roy. Soc. of Vict., Vol. XX., p. 86, 1907	Around the sea coast (E., N. Afr., & As.)	A weed
52	Bouteloua oligostachya, Torrey	Smooth Bouteloua ..	Gramineæ ..	Vict. Nat., Vol. XXIV., p. 191, 1908	North-East (N. Am.)	A useless grass
53	Brachypodium pinnatum, L.	Heath False Brome ..	,, ..	Vict. Nat., Vol. XXIV., p. 191, 1908	North-East (E. & Med. reg.)	Of slight pasture value
54	Brachypodium sylvaticum, Beauv.	Slender False Brome ..	,, ..	Vict. Nat., Vol. XXIV., p. 191, 1908	North-East (E. & As.)	,, ,,
55	Brassica campestris, L.	Rape, or Wild Turnip ..	Cruciferæ ..	Journ. of Pharm., 1887	Widely spread(Cosmop. cult.)	A weed of cultivated and waste places
56	Brassica oleracea, L. ..	Wild Cabbage ..	,, ..	Key to Vict. Pl., 1887–8	General (E., As., & Afr.)	,, ,,
57	Brassica Sinapistrum, L.	Charlock	,, ..	Journ. of Pharm., 1887	General (E., As., & Afr.)	A pest in corn fields and waste places
58	Briza maxima, L. ..	Greater Quaking Grass	Gramineæ ..	Journ. of Pharm., 1887	General (E., As., & Afr.)	An ornamental grass
59	Briza minor, L. ..	Lesser Quaking Grass ..	,, ..	Benth. Fl. Aust., Vol. VII., p. 660., 1878	General (E., As., & Afr.)	,, ,,
60	Bromus arvensis, L. ..	Field Brome Grass ..	,, ..	Vict. Nat., Vol. XXIV., p. 191, 1908	North-East (E., As., & N. Am.)	Slight fodder value
61	Bromus asper, Murray	Rough Brome Grass ..	,, ..	Vict. Nat., Vol. XXIV., p. 191, 1908	North-East (E. & As.)	Useless grass
62	Bromus inermus, Leyss.	Hungarian Brome Grass	,, ..	Vict. Nat., Vol. XXIV., p. 191, 1908	Widely spread (E. & As.)	Useful on poor soil
63	Bromus madritensis, L.	Compact Brome Grass..	,, ..	Vict. Nat., Vol. XIX., p. 124, 1903	North-West (E., N. Afr., & As.)	Of little value
64	Bromus mollis, L. ..	Soft Brome Grass ..	,, ..	Benth. Fl. Aust., Vol. VII., p. 661, 1878	General (E., As., & Afr.)	,, ,,
65	Bromus racemosus, L. ..	Smooth Brome Grass ..	,, ..	Vict. Nat., Vol. XXIV., p. 191, 1908	Widely spread (E.)	,, ,,
66	Bromus scoparius, L. ..	Mediterranean Brome	,, ..	Vict. Nat., Vol. X., p. 145, 1893	Widely spread (Med. reg. & As.)	A weed
67	Bromus sterilis, L. ..	Sterile Brome Grass ..	,, ..	Benth. Fl. Aust., Vol. VII., p. 662, 1878	General (E. & As.)	A useless grass
68	Bromus unioloides, H.B. and K.	Prairie Grass	,, ..	Journ. of Pharm., 1887	General (Am.) ..	A good pasture grass

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69	Calandrinia (Claytonia) caulescens, H.B. & K.	Purple Calandrinia ..	Portulacaceæ ..	Key to Vict. Pl., 1887–8	General (Am.) ..	A troublesome weed, especially in moist situations
70	Calendula arvensis, L. ..	Marigold	Compositæ ..	Vict. Nat., Vol. XXII. p. 79, 1905	Widely spread (E. & As.)	A weed
71	Camelina sativa, Crantz (Camelina dentata, Pers.)	Gold of Pleasure, or Common Cameline	Cruciferæ ..	Vict. Nat., Vol. XX., p. 133, 1904	North-West (E. & temp. As.)	,,
72	Capsella Bursa-pastoris, Moench.	Shepherd's Purse ..	,, ..	Benth. Fl. Aust., Vol. I., p. 82, 1863	Widely spread (Temp. reg.)	,,
73	Carduus (Cirsium) arvensis, L.	Perennial (Californian) Thistle	Compositæ ..	Key to Vict. Pl., 1887–8	General (E., As., & Afr.)	Proclaimed for the whole State
74	Carduus crispus, L. ..	Crisped Thistle ..	,, ..	Key to Vict. Pl., 1887–8	General (E., As., & Afr.)	A weed
75	Carduus (Cirsium) lanceolatus, Scop.	Spear Thistle ..	,, ..	Benth. Fl. Aust., Vol. III., p. 458, 1866	General (E., As., & Afr.)	Proclaimed for the whole State
76	Carduus (Silybum) Marianus, L.	Spotted Thistle ..	,, ..	Benth. Fl. Aust., Vol III., p. 458, 1866	General (E., As., & Afr.)	,, ,, ,,
77	Carduus pycnocephalus, Jacq.	Shore Thistle ..	,, ..	Journ. of Pharm., 1887	General (E., As., & Afr.)	,, ,, ,,
78	Carthamus tinctorius, L.	Safflower	,, ..	Key to Vict. Pl., 1887–8	Widely spread (E. As., & Afr.)	A weed when growing wild
79	Carum Petroselinum, Benth.	Parsley	Umbelliferæ ..	Key to Vict. Pl., 1887–8	General (E., As., Afr.)	,, ,, ,,
80	Caucalis nodosa, Scop.	Knotted Caucalis ..	,, ..	Vict. Nat., Vol. X., p. 145, 1883	General (E.) ..	A troublesome weed
81	Celsia cretica, L. ..	Cretan Mullein ..	Scrophulariaceæ	Benth. Fl. Aust., Vol. IV., p. 473, 1869	General (E.) ..	A weed
82	Cenchrus tribuloides, L.	Hedge-hog or Burr Grass	Gramineæ ..	Vict. Nat., Vol. XXIV., p. 15, 1907	Widely spread (N Am.)	An injurious grass
83	Centaurea Calcitrapa, L.	Star Thistle	Compositæ ..	Journ. of Pharm., 1887	General (E., As., & Afr.)	Proclaimed for the whole State
84	Centaurea melitensis, L.	Malta Thistle ..	,, ..	Benth. Fl. Aust., Vol. III., p. 458, 1866	General (E., As., & Afr.)	,, ,, ,,

85	Centaurea Picris, L. ..	Hard Heads	,, ..	Vict. Nat., Vol. XXIII., p. 184, 1907	Widely spread (Caspian reg.)	A weed
86	Centaurea solstitialis, L.	St. Barnaby's Thistle ..	,, ..	Key to Vict. Pl., 1887–8	General (E., As., & Afr.)	Proclaimed for the whole State
87	Cerastium quaternellum, Fenzl.	Fenzl's Mouse-ear Chickweed	Caryophyllaceæ	Vict. Nat., Vol. X., p. 145, 1893	Widely spread (E. & Am.)	A weed
88	Cerastium vulgatum, L.	Mouse-ear Chickweed ..	,,	Benth. Fl. Aust., Vol. I. p. 156, 1863	General (Temp. & Sub-trop. reg.)	,,
89	Cheiranthus Cheiri, L. ..	Wallflower	Cruciferæ ..	Vict. Nat., Vol. X., p. 144, 1893	Widely spread, but not plentiful (E.)	Probably only a garden escape
90	Chenopodium ambrosioides, L.	Mexican Tea	Chenopodiaceæ	Key to Vict. Pl., 1887–8	General (Am.) ..	A weed
90A	,, var. anthelminticum	Worm-seed	,, ..	Key to Vict. Pl., 1887–8	General (Am.)	
91	Chenopodium bonus-henricus, L.	Good King Henry ..	,, ..	Vict. Nat., Vol. XXII. p. 79, 1905	South-West (E.) ..	A weed with a perennial root-stock
92	Chenopodium (Roubieva) multifidum, L.	Scented Goosefoot ..	,, ..	Proc. Roy. Soc. of Vict. Vol. XXII., 1909	Port Phillip (S. Am.)	A weed
93	Chenopodium vulvaria, L.	Stinking Goosefoot ..	,, ..	Vict. Nat., Vol. XXIV. p. 191, 1908	Widely spread (E. & N. Am.)	A weed of cultivated and waste places
94	Chrysanthemum Leucanthemum, L.	Ox-eye Daisy ..	Compositæ ..	Vict. Nat., Vol. XXII. p. 79, 1905	General (E. & As.)	A weed
95	Chrysanthemum Parthenium, Hoffm.	Feverfew	,, ..	Vict. Nat., Vol. X., p. 145, 1893	General (E.) ..	,,
96	Chrysanthemum segetum, L.	Corn Marigold ..	,, ..	Benth. Fl. Aust., Vol. III., p. 547, 1866	General (E., As., & Afr.)	,,
97	Cichorium Intybus, L...	Chicory	,, ..	Journ. of Pharm., 1887	General (E., As., & Afr.)	Of slight use as a pasture plant
98	Conium maculatum, L.	Hemlock	Umbelliferæ ..	Proc. Roy. Soc. of Vic. Vol. XX., p. 86, 1907	General (E. & As.) ..	A poisonous plant, proclaimed for the whole State
99	Convolvulus arvensis, L.	Lesser Bindweed ..	Convolvulaceæ..	Vict. Nat., Vol. X., 145, 1893	General (E., As., & Afr.)	Proclaimed for the whole State. A poisonous pest in gardens and among crops
100	Crepis fœtida, L. ..	Fetid Hawk's Beard ..	Compositæ ..	Vict. Nat., Vol. XXIV. p. 15, 1907	Widely spread (E. & As.)	A bad weed
101	Crepis taraxacifolia, Thuill.	Beaked or Dandelion Crepis	,, ..	Vict. Nat., Vol. XXIII., p. 32, 1906	Widely spread (E.)	A troublesome weed

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102	Crepis tectorium, L. ..	Tall Crepis	Compositæ ..	Vict. Nat., Vol. XXII., p. 79, 1905	Widely spread (E. & As.)	A troublesome weed
103	Crithmum maritimum, L.	Common Samphire ..	Umbelliferæ ..	Key to Vict. Pl., 1887–8	Widely spread, but not plentiful (E., As., & Afr.)	A weed
104	Cryptostemma calendulacea, R.Br.	Cape Weed	Compositæ ..	Benth. Fl. Aust., Vol. III., p. 675, 1866	General (Afr.) ..	Proclaimed for two shires
105	Cucumis myriocarpus, Naud.	Gooseberry Cucumber ..	Cucurbitaceæ ..	Key to Vict. Pl., 1887–8	Widely spread (Afr.)	A troublesome weed
106	Cuscuta epithymum, Murray	European Dodder ..	Convolvulaceæ..	Key to Vict. Pl., 1887–8	Widely spread (E., As., & Afr.)	Parasite on lucerne, &c. Proclaimed for the whole State
107	Cynara cardunculus, L. (C. Scolymus, L.)	Artichoke	Compositæ ..	Journ. of Pharm., 1887	Widely spread (Med. reg.)	Often grown in gardens, and thence escaping
108	Cynosurus cristatus, L.	Crested Dog's-tail Grass	Gramineæ ..	Key to Vict. Pl., 1887–8	General (E., As., & Afr.)	A useful pasture grass
109	Cytisus canariensis, L.	Cape Broom	Leguminosæ ..	Key to Vict. Pl., 1887–8	General (E. & Afr.)	A hedge plant. Proclaimed for various shires
110	Cytisus scoparius, Link.	English Broom ..	,, ..	Journ. of Pharm., 1887	General (E.) ..	A hedge plant. Proclaimed for two shires
111	Dactylis glomerata, L. ..	Cock's-foot Grass ..	Gramineæ ..	Benth. Fl. Aust., Vol. VII., p. 640, 1878	General (E., As., & Afr.)	A useful pasture grass
112	Datura Stramonium, L.	Thorn Apple	Solanaceæ ..	Journ. of Pharm., 1887	General (Am.) ..	A poison plant. Proclaimed for the whole State
113	Daucus Carota, L. ..	Carrot	Umbelliferæ ..	Journ. of Pharm., 1887	General, but not plentiful (E. & As.)	Becomes a weed when growing wild
114	Deschampsia (Aira) flexuosa, Trin.	Wavy Hair Grass ..	Gramineæ ..	Vict. Nat., Vol. XXIV., p. 191, 1908	North-East (N. Temp. reg.)	More ornamental than useful
115	Dianthus Armeria, L. ..	Deptford Pink ..	Caryophyllaceæ	Benth. Fl. Aust., Vol. I., p. 156, 1863	Darebin Creek (E.)	Probably only a garden escape
116*	Diplotaxis muralis, D.C.	Wall Mustard ..	Cruciferæ ..	Vict. Nat., Vol. XVI., p. 119, 1899	Widely spread (E.)	A weed
117	Diplotaxis tenuifolia, D.C.	Sand Mustard or Rocket	,, ..	.. .. ..	S.W. Victoria (E.)..	,,

118	Ecballium elaterium, A. Rich.	Squirting Cucumber ..	Cucurbitaceæ ..	Proc. Roy. Soc. of Vict., Vol. XX., p. 86, 1907	Near Geelong (Medit. reg.)	,,
119	Echium violaceum, L. ..	Paterson's Curse, or Purple Bugloss	Boraginaceæ ..	Benth. Fl. Aust., Vol. IV., p. 385, 1869	General (S. E.) ..	A weed. Proclaimed for two shires
120	Ehrharta longiflora, Sw.	Veldt Grass	Gramineæ ..	Benth. Fl. Aust., Vol. VII., p. 551, 1878	Widely spread (S. Afr.)	Of some use as a pasture grass in moist situations
121	Eichhornia speciosa, Kunth.	Water Hyacinth ..	Pontederiaceæ ..	Vict. Nat., Vol. XVII., p. 100, 1900	In rivers and lagoons (N.Am.)	Proclaimed for the whole State
122	Eleusine coracana, Gaertn.	Ragi, Kurakkan, or Indian Millet	Gramineæ ..	Vict. Nat., Vol. XXIV., p. 15, 1907	Widely spread (As., Afr., & Am.)	Slight value as a pasture grass
123	Elymus arenarius, L. ..	Sand-Lyme Grass ..	,, ..	Vict. Nat., Vol. XXIV., p. 191, 1908	Around sea coast (Medit. reg.)	A useful grass for binding drift sand
124	Emex australis, Steinh...	Spiny Emex	Polygonaceæ ..	Vict. Nat., Vol. X., p. 145, 1893	Widely spread (S. Afr. & S. and W. Aus.)	A weed
125	Erigeron canadense, L.	Canadian Flea-bane ..	Compositæ ..	Vict. Nat., Vol. XXIV., p. 191, 1908	Widely spread (Am.)	,,
126	Erigeron linifolius, Willd.	Flax-leaved Flea-bane	,, ..	Benth. Fl. Aust., Vol. III., p. 495, 1866	General (Trop.) ..	,,
127	Erodium cicutarium, L'Herit.	Stork's-bill	Geraniaceæ ..	Benth. Fl. Aust., Vol. I., p. 298, 1863	General (E., As., & Afr.)	,,
128	Erodium moschatum, Willd.	Musk-Erodium ..	,, ..	Benth. Fl. Aust., Vol. I., p. 297, 1863	General (E., As., & Afr.)	,,
129	Erophila vulgaris, D.C.	Common Erophila ..	Cruciferæ ..	Vict. Nat., Vol. XIX., p. 136, 1903	South-West (E. & As.)	,,
130	Erysimum repandum, L.	Treacle Mustard ..	,, ..	Vict. Nat., Vol. XX., p. 76, 1903	North-West (E., As. & Afr.)	Proclaimed for one shire
131	Euphorbia helioscopia, L.	Sun Spurge	Euphorbiaceæ ..	Key to Vict. Pl., 1887–8	Widely spread, but not yet plentiful (E., As., & Afr.)	A weed
132	Euphorbia Lathyris, L.	Caper Spurge.. ..	,, ..	Vict. Nat., Vol. X., p. 144, 1893	Widely spread (S. E.)	,,
133	Euphorbia Peplus, L. ..	Petty Spurge.. ..	,, ..	Benth. Fl. Aust., vol. VI., p. 46, 1873	General (E., As., & Afr.)	A weed of waste places
134	Festuca bromoides, L....	Brome-like Fescue ..	Gramineæ ..	Benth. Fl. Aust., Vol. VII., p. 663, 1878	General (E., As., & Afr.)	A useless grass
135	Festuca elatior, L. ..	Meadow Fescue ..	,, ..	Vict. Nat., Vol. XXIV., p. 191, 1908	Widely spread (E. & N. As.)	A useful fodder grass

* See also Proc. Roy. Soc. of Vict., Vol. XX., p. 130, 1907-8.

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136	Festuca gigantea, Vill.	Tall Fescue	Gramineæ ..	Vict. Nat., Vol. XXIV., p. 191, 1908	North-East (E., As., & Afr.)	Of slight fodder value
137	Festuca loliacea, Huds.	Lolium Fescue ..	,, ..	Vict. Nat., Vol. XXIV., p. 191, 1908	North-East (E.) ..	,, ,,
138	Festuca myurus, L. ..	Hard Fescue	,, ..	Vict. Nat., Vol. XXIV., p. 191, 1908	North-East (E., As., & Afr.)	A useless grass
139	Festuca ovina, L. ..	Sheep's Fescue ..	,, ..	Vict. Nat., Vol. XXIV., p. 191, 1908	Widely spread (Temp. & Arc. reg.)	A fair pasture grass
140	Festuca rigida, Mert. & Koch.	Rigid Fescue	,, ..	Vict. Nat., Vol. X., p. 145, 1893	General (E. & N. Afr.)	A useless grass
141	Festuca rubra, L. ..	Red Fescue	,, ..	Vict. Nat., Vol. XXIV., p. 191, 1908	North-East (N. Temp. & Arc. reg.)	Of very slight pasture value
142	Fœniculum vulgare, Gaertn.	Fennel	Umbelliferæ ..	Journ. of Pharm., 1887	General (E., As., & Afr.)	A troublesome weed
143	Fumaria officinalis, L. ..	Fumitory	Fumariaceæ ..	Benth. Fl. Aust., Vol. I., p. 63, 1863	General (E., As., & Afr.)	A weed
143A	,, var. capreolata (F. capreolata, L.)	Rampant Fumitory ..	,, ..	Vict. Nat., Vol. XXIV., p. 191, 1908	General (E., As., & Afr.)	,,
143B	,, var. densiflora (F. densiflora, D.C.)	Small Flowered Fumitory	,, ..	Vict. Nat., Vol. XXIV., p. 191, 1908	General (E., As., & Afr.)	,,
144	Galenia secunda,* Sond.	Galenia	Ficoideæ ..	Vict. Nat., Vol. XIX., p. 5., 1902	South-West & South (Afr.)	,,
145	Galinsoga parviflora, Cav.	Small-flowered Galinsoga	Compositæ ..	Key to Vict. Pl., 1887–8	Widely spread, but not plentiful (Am.)	,,
146	Galium Aparine, L. ..	Goose Grass or Cleavers	Rubiaceæ ..	Benth. Fl. Aust., Vol. III., p. 447, 1866	Widely spread (E., As., & Afr.)	,,
147	Gilia (Navarretia) squarrosa, Hook & Arn.	Californian Stinkweed, Digger's Weed, or Sheep's Weed	Polemoniaceæ ..	Key to Vict. Pl., 1887–8	General (N. Am.) ..	A weed. Proclaimed for the whole State
148	Gladiolus cuspidatus, Jacq.	Wild Gladiolus ..	Irideæ ..	Proc. Roy. Soc. of Vict. Vol. XX., p. 86, 1907	Widely spread (S. Afr.)	A troublesome bulbous weed
149	Glaucium luteum, Scop.	Horned Poppy ..	Papaveraceæ ..	Vict. Nat., Vol. X., p. 144, 1893	Widely spread (E.)	A weed

150	Gnaphalium candidissimum, Lam.	White Cudweed ..	Compositæ ..	Vict. Nat., Vol. XXIII., p. 144, 1906	Widely spread (S. Afr.)	,,
151	Gomphocarpus fruticosus, R. Br.	Arghel of Syria ..	Asclepiadaceæ ..	Key to Vict. Pl., 1887	Widely spread (Afr.)	A troublesome plant when growing wild
152	Gypsophila perfoliata, L.	Perfoliate Gypsophyll ..	Caryophyllaceæ	Vict. Nat., Vol. X., p. 145, 1893	Widely spread (S. E.)	A weed
153	Hedypnois cretica, Willd.	Cretan Hedypnois ..	Compositæ ..	Vict. Nat., Vol. X., p. 145, 1893	General (Med. reg.)	,,
154	Hibiscus trionum, L. ..	Bladder Hibiscus ..	Malvaceæ ..	Vict. Nat., Vol. XXI., p. 172, 1905	North-West (E., As., Afr., & Aus., except Vict. and Tas.)	,,
155	Holcus lanatus, L. ..	Yorkshire Fog Grass ..	Gramineæ ..	Benth. Fl. Aust., Vol. VII., p. 586, 1878	General (E., As., & Afr.)	Of some use as a pasture grass
156	Holcus mollis, L. ..	Creeping Velvet Grass ..	,, ..	Key to Vict. Pl., 1887–8	Widely spread (E., As., & Afr.)	,, ,, ,,
157	Homeria collina, Vent. (var. miniata, Sweet)	Cape Tulip	Irideæ ..	Vict. Nat., Vol. X., p. 145, 1893	Widely spread (Afr.)	A poison plant. Proclaimed for the whole State
158	Hordeum murinum, L.	Barley Grass	Gramineæ ..	Benth. Fl. Aust., Vol. VII., p. 669, 1878	General (E., As., & Afr.)	A useless grass
159	Hordeum secalinum, L. (Hordeum nodosum, L.)	Knotted Barley Grass ..	,, ..	Key to Vict. Pl., 1887–8	Widely spread (E., As., & Afr.)	A useless and troublesome grass
160	Hypericum androsaemum, L.	The Tutsan	Hypericaceæ ..	Vict. Nat., Vol. XX., p. 164, 1904	South-West (E. & As.)	A weed
161	Hypericum perforatum, L.	St. John's Wort ..	,, ..	Vict. Nat., Vol. X., p. 144, 1893	North-East (E., N. As., & N. Am.)	Proclaimed for the whole State
162	Hypochaeris glabra, L.	Smooth Cat's-ear ..	Compositæ ..	Benth. Fl. Aust., Vol. III., p. 677, 1866	General (E., As., & Afr.)	A weed
163	Hypochaeris radicata, L.	Flatweed or Cat's-ear ..	,, ..	Benth. Fl. Aust., Vol. III., p. 677, 1866	General (E., As., & Afr.)	,,
164	Inula graveolens, Desf.	Stinkwort	,, ..	Vict. Nat., Vol. X., p. 145, 1893	Widely spread (Med. reg.)	Proclaimed for the whole State
165	Iris germanica, L. ..	Fleur de Lis, German Iris or Flag	Irideæ ..	Journ. of Pharm., 1887	Widely spread (E. & As.)	A weed when wild
166	Juncus bufonius,† L. ..	Toad Rush	Juncaceæ ..	Key to Vict. Pl., 1887–8	General (E., As., Afr., & Am.)	A weed
167	Juncus capitatus, Weigel.	Capitate Rush ..	,, ..	Vict. Nat., Vol. X., p. 145, 1893	Widely spread (E. & Afr.)	,,

* *See* also *Journ. of Roy. Soc. of N.S.W.*, Vol. LXII., p. 197, 1908.——† Given as native in Benth. Flora Aust., Vol. VII., p. 127, 1887.

No.	Botanical Name.	Common Name.	Natural Order.	Date and place of first published record of Naturalization.	Local distribution and original home.	Character.
168	Kentrophyllum lanatum, D. C.	Saffron Thistle ..	Compositæ ..	Key to Vict. Pl., 1887–8	General (E., As., & Afr.)	Proclaimed for the whole State
169	Koeleria cristata, L. ..	Crested Hair Grass or Cat's-tail Grass	Gramineæ ..	Benth. Fl. Aust., Vol. VII., p. 639, 1878	Widely spread (E., As., & Afr.)	A fair pasture grass
170	Koeleria phleoides, Pers.	Cat's-tail Kœleria ..	,, ..	Benth. Fl. Aust., Vol. VII., p. 639, 1878	Widely spread (E., As., & Afr.)	,, ,,
171	Lactuca saligna, L. ..	Wild Lettuce.. ..	Compositæ ..	Benth. Fl. Aust., Vol. III., p. 680, 1866	General (E., As., & Afr.)	A weed with slight pasture value
172	Lagurus ovatus, L. ..	Hare's Tail Grass ..	Gramineæ ..	Vict. Nat., Vol. X., p. 145, 1893	Widely spread (E. & Afr.)	More ornamental than useful
173	Lamarckia aurea, Moench.	Golden Lamarckia ..	,, ..	Benth. Fl. Aust., Vol. VII., p. 636, 1878	General (E., As., & Afr.)	Of slight pasture value
174	Lamium amplexicaule, L.	Henbit, Dead Nettle ..	Labiatæ ..	Vict. Nat., Vol. XIX., p. 124, 1903	Widely spread (E. & As.)	A weed
175	Lavandula Stoechas, L...	Topped Lavender ..	,, ..	Vict. Nat., Vol. X., p. 145, 1893	Widely spread (Med. reg.)	Useful as a bee plant
176	Lepidium campestre, R. Br.	Field Cress	Cruciferæ ..	Vict. Nat., Vol. X., p. 144, 1893	Widely spread (E.)	A weed
177	Lepidium Draba, L. ..	Hoary Cress	,, ..	Key to Vict. Pl., 1887–8	General (E., As., & Afr.)	A troublesome weed
178	Linaria Elatine, Mill. ..	Hairy Toad-flax ..	Scrophulariaceæ	Vict. Nat., Vol. X., p. 145, 1893	General (E. & As.)..	A sporadic weed of waste places
179	Lithospermum arvense, L.	Iron Weed, Corn Gromwell	Boraginaceæ ..	Benth. Fl. Aust., Vol. IV., p. 385, 1869	General (E., As., & Afr.)	A pest in cornfields
180	Lobelia Erinus, L. ..	Prickly Lobelia ..	Campanulaceæ (Lobeliaceæ)	Key to Vict. Pl., 1887–8	Widely spread (S. Afr.)	A poisonous weed
181	Lolium italicum, A. Br.	Italian Rye Grass ..	Gramineæ ..	Proc. Roy. Soc. of Vict., Vol. XX., p. 86, 1907	Widely spread from cultivation (E.)	A useful pasture grass
182	Lolium perenne, L. ..	Perennial Rye Grass ..	,, ..	Benth. Fl. Aust., Vol. VII., p. 667, 1878	General (E., As., & Afr.)	A useful pasture and lawn grass
183	Lolium temulentum, L.	Darnel Grass ..	,, ..	Benth. Fl. Aust., Vol. VII., p. 668, 1878	General (E., As., & Afr.)	Of slight pasture value, but the seeds often poisonous
184	Lotus tetragonolobus, L.	Winged Pea ..	Leguminosæ ..	Key to Vict. Pl., 1887–8	Widely spread (Med. reg.)	Has a slight fodder value

185	Lychnis dioica, L., var. alba (Lychnis vespertina, Sibth.)	White Campion ..	Caryophyllaceæ	Vict. Nat., Vol. XXIV., p. 15, 1907	East Vict. (E. & N. Am.)	A weed
186	Lychnis Githago, L. ..	Corn-cockle	,, ..	Benth. Fl. Aust., Vol. I., p. 156, 1863	General (E., As., & Afr.)	A weed of cornfields
187	Lycium chinense, Mill...	Chinese Box Thorn ..	Solanaceæ ..	Benth. Fl. Aust., Vol. IV., p. 467, 1869	Widely spread (China)	A hedge plant
188	Lycium horridum, Thunb.	Horrid Box Thorn ..	,, ..	Vict. Nat., Vol. XXIV., p. 191, 1908	Widely spread from cultivation (S. Afr.)	A hedge plant. Proclaimed for the whole State
189	Lysimachia vulgaris, L.	Loosestrife	Primulaceæ ..	Vict. Nat., Vol. X., p. 145, 1893	Widely spread (E. & As.)	A weed
190	Madia sativa, Mol. ..	Pitch Weed	Compositæ ..	Key to Vict. Pl., 1887–8	Principally the N. districts (Am.)	A troublesome weed, proclaimed for two shires
191	Malva parviflora, L. ..	Small-flowered Mallow	Malvaceæ ..	Benth Fl. Aust. Vol I., p. 186, 1863	Widely spread (E.)	A weed
192	Malva rotundifolia, L...	Dwarf Mallow ..	,, ..	Benth. Fl. Aust., Vol. I., p. 186, 1863	General (E., As., & Afr.)	,,
193	Malva sylvestris L. ..	Tall Mallow	,, ..	Benth. Fl. Aust., Vol. I., p. 186, 1863	General (E., As., & Afr.)	,,
194	Malva verticillata, L. ..	Whorled Mallow ..	,, ..	Vict. Nat., Vol. XXIV., p. 191, 1908	North-West (E., As., & Afr.)	,,
195	Marrubium vulgare, L.	Horehound	Labiatæ ..	Benth. Fl. Aust., Vol. V., p. 73, 1870	General (E., As., & Afr.)	A herb. Proclaimed for two shires
196	Matricaria discoidea, D. C.	Rounded Chamomile ..	Compositæ ..	Proc. Roy. Soc. of Vict Vol. XX., p. 86, 1907	Widely spread (As. & N. Am.)	A weed
197	Medicago denticulata, Willd.	Burr Medick ..	Leguminosæ ..	Benth. Fl. Aust., Vol. II., p. 186, 1864	General (E., As., & Afr.)	A pasture weed, with burred fruits
198	Medicago hispida, Gaertn. (var. inermis, Urb.)	Rough Medick ..	,, ..	Proc. Roy. Soc. of Vict., Vol. XX., p. 133, 1907	North-West & South-West (S. E.)	Of very little value for pastures
199	Medicago lupulina, L. ..	Black Medick ..	,, ..	Benth. Fl. Aust., Vol. II., p. 186, 1864	General (E., As., & Afr.)	A fair pasture plant, especially in moist situations or on clay soils
200	Medicago maculata, L. (Medicago arabica, L.)	Spotted Medick ..	,, ..	Journ. of Pharm., 1887	General (E., As., & Afr.)	Of little value as a pasture plant
201	Medicago minima, L. ..	Small Burr Medick ..	,, ..	Vict. Nat., Vol. XXIII., p. 184, 1907	South-West (E. & As.)	A weed

No.	Botanical Name.	Common Name.	Natural Order.	Date and place of first published record of Naturalization.	Local distribution and original home.	Character.
202	Medicago orbicularis, All.	Flat Snail Clover ..	Leguminosæ ..	Vict. Nat., Vol. XXIV., p. 15, 1907	Widely spread by cultivation (Med. reg.)	A good pasture plant
203	Medicago sativa, L. ..	Lucerne	,, ..	Benth. Fl. Aust., Vol. II., p. 186, 1864	General (E. & As.)..	A good fodder plant
204	Medicago scutellata, L.	Snail Clover	,, ..	Vict. Nat., Vol. XXIV., p. 15, 1907	Widely spread (Med. reg.)	A good pasture and fodder plant
205	Medicago tribuloides, Desr.	Caltrop Medick ..	,, ..	Vict. Nat., Vol. XXIII., p. 184, 1907	South-West (E.) ..	Of slight value as a pasture plant
206	Melica uniflora, Retz. ..	Wood Melica ..	Gramineæ ..	Vict. Nat., Vol. XXIV., p. 191, 1908	North-East (E. & As.)	Of very slight pasture value
207	Melilotus alba, Desr. ..	Bokhara Clover ..	Leguminosæ ..	Journ. Roy. Soc. of N.S.W., Vol. XLII., p. 199, 1908	General (E. & As.)	A useful pasture plant
208	Melilotus parviflora, Desf.	Small-flowered Melilot	,, ..	Key to Vict. Pl., 1887–8	General (E., As., & Afr.)	Of some slight use to improve sandy soils
209	Melissa officinalis, L. ..	Balm Herb	Labiatæ ..	Benth. Fl. Aust., Vol. V., p. 73 1870	Widely spread (E. & As.)	Usually found in the vicinity of gardens
210	Mentha Pulegium, L. ..	Pennyroyal	,, ..	Journ. of Pharm., 1887	General (E. As., & Afr.)	Culinary plant
211	Mesembryanthemum cordifolium, L.	Heart-leaved Ice-plant or Pig-face	Ficoideæ ..	Journ. of Pharm., 1887	Widely spread (S. Afr.)	Useful for covering rocky slopes and waste places
212	Mesembryanthemum crystallinum, L.	Ice-plant	,, ..	Key to Vict. Pl., 1887–8	Widely spread (E., As., & Afr.)	,, ,, ,,
213	Mesembryanthemum edule, L.	Hottentot Fig ..	,, ..	Journ. of Pharm., 1887	Widely spread (S. Afr.)	,, ,, ,,
214	Milium effusum, L. ..	English Millet Grass ..	Gramineæ ..	Vict. Nat., Vol. XXIV., p. 191, 1908	North-East (E., As., & Am.)	A fair pasture grass
215	Mimulus moschatus, Dougl.	Musk-scented Monkey-flower	Scropulariaceæ	Vict. Nat., Vol. X., p. 145, 1893	Widely spread (N. Am.)	Not plentiful; a useless weed
216	Modiola multifida, Moench.	Red-flowered Creeping Mallow	Malvaceæ ..	Journ. of Pharm., 1887	General (Am.) ..	A weed
217	Molinia coerulea, Moench.	Purple Molinia ..	Gramineæ ..	Vict. Nat., Vol. XXIV., p. 191, 1908	North-East (E. & As.)	Of very slight pasture value

218	Moluccella laevis, L. ..	Molucca Balm ..	Labiatæ ..	Vict. Nat., Vol. X., p. 145, 1893	North-West (W. As.)	A weed
219	Moraea xerospatha, MacOwan	Thread Iris	Irideæ .. ,, ..	Journ. of Roy. Soc. of N.S.W., Vol. XLII., p. 199, 1908	North-West & South (S. Afr.)	,,
220	Nasturtium officinale, R. Br.	Water Cress	Cruciferæ ..	Benth. Fl. Aust., Vol. I., p. 65, 1863	Widely spread in water courses (E., As., & Afr.)	An edible weed, troublesome in irrigation channels
221	Nicandra physaloides, Gaertn.	Apple of Peru ..	Solanaceæ ..	Vict. Nat., Vol. X., p. 145, 1893	North-West (S. Am.)	Decorative plant
222	Nicotiana glauca, Gaertn.	Wild Tobacco, or Tree Tobacco Plant	,, ..	Benth. Fl. Aust., Vol. IV., p. 469, 1869	Widely spread (Am.)	A poison plant
223	Nolana prostrata, L. ..	Prostrate Bell-flower ..	Convolvulaceæ	Vict. Nat., Vol. X., p. 145, 1893	South-West (S. Am.)	Garden plant
224	Œnothera biennis, L. ..	Evening Primrose ..	Onagrariaceæ ..	Key to Vict. Pl., 1887–8	General (Am.) ..	,,
225	Œnothera tetraptera, Cav.	Four-winged Evening Primrose	,, ..	Vict. Nat., Vol. X. p. 145, 1893	Widely spread (S. Am.)	,,
226	Ononis arvensis, L. (Ononis repens, L.)	Restharrow	Leguminosæ ..	Vict. Nat., Vol. XXIV., p. 191, 1908	South-West (E. & As.)	A weed
227	Ononis Natrix, L. ..	Goat Root	,, ..	Benth. Fl. Aust., Vol. II., p. 186, 1864	Widely spread (Med. reg.)	,,
228	Onopordon Acanthium, L.	Scotch Thistle ..	Compositæ ..	Benth. Fl. Aust., Vol. III., p. 458, 1866	General (E., As., & Afr.)	Proclaimed for the whole State
229*	Opuntia monacantha, Haw.	Drooping Prickly Pear..	Cactaceæ ..	Agric. Gaz. of N.S.W., Vol. IX., p. 1003, 1898	Widely spread (Am.)	,, ,, ,,
230	Origanum vulgare, L. ..	Marjoram	Labiatæ ..	Benth. Fl. Aust., Vol. V., p. 72, 1870	East (E., As., & Afr.)	A condiment; also useful as a honey plant
231	Oryzopsis miliacea, Benth. & Hook f.	Rice Millet	Graminaceæ ..	Vict. Nat., Vol. XXIV., p. 192, 1908	Widely spread (E., As., & Afr.)	Of some slight use as a pasture grass
232	Oxalis cernua, Thunb...	South African Wood-Sorrel	Geraniaceæ ..	Vict. Nat., Vol. XXIV., p. 15, 1907	Widely spread (S. Afr.)	A troublesome pest
233	Oxalis tetraphylla, Cav.	Four-leaved Wood-Sorrel	,, ..	Journ. of Roy. Soc. of N.S.W., Vol. XLII., p. 199, 1908	Gippsland (N. Am.)	A troublesome pest
234	Oxalis variabilis Jacq. (Oxalis grandiflora, Jacq.)	Large-flowered Wood Sorrel	,, ..	Journ. of Pharm., 1887	Widely spread, but not plentiful (S. Afr.)	A weed

* This plant was recorded in the Key to Vict. Plants (1887-8) as O. Dillenii, Haw., which was a wrong determination.

No.	Botanical Name.	Common Name.	Natural Order.	Date and place of first published record of Naturalization.	Local distribution and original home.	Character.
235	Papaver dubium, L. ..	Long-headed Poppy ..	Papaveraceæ ..	Vict. Nat., Vol. XIX., p. 159, 1902	North-West (E.) ..	A weed
236	Papaver hybridum, L...	Wild Poppy	,, ..	Key to Vict. Pl., 1887–8	General (E., As., & Afr.)	,,
237	Papaver Rhœas, L. ..	Field Poppy	,, ..	Benth. Fl. Aust., Vol. I., p. 63, 1863	Widely spread (E., As., & Afr.)	,,
238	Paspalum dilatatum, L.	Golden Crown Grass ..	Gramineæ ..	Vict. Nat., Vol. XXIV., p. 192, 1908	Naturalized by cultivation (Am.)	A perennial fodder grass
239	Paspalum distichum, L.	Silt Grass	,, ..	Benth. Fl. Aust., Vol. VII., p. 460, 1878	Widely spread (Am.)	Useful for covering silt, &c.
240	Pennisetum longistylum, Hochst.	Long Styled Feather Grass	,, ..	Vict. Nat., Vol. XXIV., p. 16, 1907	Widely spread (Afr.)	An ornamental grass
241	Pennisetum macrourum, Trin.	African Feather Grass ..	,, ..	Vict. Nat., Vol. XXIV., p. 192, 1908	Port Phillip & County of Follett (S. Afr.)	More ornamental than useful
242	Peucedanum (Anethum) graveolens, L.	Dill	Umbelliferæ ..	Journ. of Pharm., 1887	Widely spread (E. & As.)	A weed when growing wild
243	Peucedanum sativum, Benth.	Parsnip	,, ..	Journ. of Pharm., 1887	General (E. & As.)	A weed when wild
244	Phalaris arundinacea, L.	Reed Canary Grass ..	Gramineæ ..	Vict. Nat., Vol. XXIV., p. 192, 1908	North-East & South-West (E., As., & Am.)	A fairly useful fodder grass in moist situations
245	Phalaris bulbosa, L.* ..	Toowoomba Canary Grass	,, ..	Journ. of Agric. of Vict., Vol. VI., p. 738, 1908	General (E.) ..	Spread by cultivation; a fair winter fodder grass
246	Phalaris canariensis, L.	Canary Grass ..	,, ..	Journ. of Pharm., 1887	General (E., As., & Afr.)	A fair pasture grass
247	Phalaris coerulescens, Desf.	Blue Canary Grass ..	,, ..	Vict. Nat., Vol. XXIV., p. 192, 1908	Naturalized by cultivation (Med. reg.)	Of some use as a fodder grass
248	Phalaris minor, Retz. ..	Lesser Canary Grass ..	,, ..	Benth. Fl. Aust., Vol. VII., p. 557, 1878	General (E., As., & Afr.)	Probably only a variety of P. canariensis
249	Phleum pratense, L. ..	Timothy Grass ..	,, ..	Journ. of Pharm., 1887	Widely spread (E., As., & Afr.)	A good pasture grass
250	Phytolacca octandra, L.	Red Ink Plant ..	Phytolaccaceæ	Benth. Fl. Aust., Vol. V., p. 143, 1870	Widely spread (N. & S. Am.)	A weed

251	Picris echioides, L. ..	Oxtongue	Compositæ ..	Key to Vict. Pl., 1887–8	General (E., As., & Afr.)	A troublesome weed
252	Picris hieracioides, L. ..	Hawkweed Picris ..	,, ..	Benth. Fl. Aust., Vol. III., p. 618, 1876	General (E., As., & Afr.)	,, ,,
253	Plantago coronopus, L.	Buckshorn Plantain ..	Plantaginaceæ ..	Benth. Fl. Aust., Vol. V., p. 138, 1870	General (N. temp. reg.)	A weed
254	Plantago lanceolata, L...	Ribwort Plantain ..	,, ..	Benth. Fl. Aust., Vol. V., p. 138, 1870	General (E. & As.)..	Has slight fodder value
255	Plantago major, L. ..	Larger Ribwort Plantain	,, ..	Journ. of Pharm., 1887	Widely spread (E., A., & Afr.)	,, ,,
256	Poa alpina, L. ..	Alpine Poa	Gramineæ ..	Vict. Nat. Vol. XXIV., p. 192, 1908	East (N. E., N. As., & N. Am.)	Of slight value as a pasture grass
257	Poa annua, L. ..	Annual Poa	,, ..	Benth. Fl. Aust., Vol. VII., p. 654, 1878	General (E., As., & Afr.)	Of slight pasture value
258	Poa bulbosa, L. ..	Bulbous Rooted Poa ..	,, ..	Vict. Nat., Vol. XX., p. 133, 1904	North-West (E., As., & Afr.)	,, ,,
259	Poa compressa, L. ..	Flattened Poa ..	,, ..	Vict. Nat., Vol. XXIV., p. 192, 1908	Widely spread (N. temp. reg.)	Of slight use as a pasture grass
260	Poa nemoralis ..	Wood Poa	,, ..	Vict. Nat., Vol. XXIV., p. 192, 1908	Widely spread (E., As. & Am.)	A perennial pasture grass
261	Poa pratensis, L. ..	English Meadow Grass, Kentucky Blue Grass	,, ..	Journ. of Pharm., 1887	General (E., As., & Am.)	A useful perennial pasture grass
262	Poa trivialis, L. ..	Meadow Poa ..	,, ..	Key to Vict. Pl., 1887–8	General (E., As., & Afr.)	A good perennial pasture grass; also a lawn grass
263	Polygala myrtifolia, L...	Myrtle-leaved Milkwort	Polygalaceæ ..	Journ. of Phar., 1887 ..	Widely spread (S. Afr.)	An ornamental shrub
264	Polygonum aviculare, L.	Knot-weed, Hogweed, or Wire-weed	Polygonaceæ ..	Benth. Fl. Aust., Vol. V., p. 267, 1870	General (E., As., & Afr.)	A troublesome pest in cultivated ground
265	Polygonum Convolvulus, L.	Black Bindweed ..	,, ..	Vict. Nat., Vol. X., p. 145, 1893	Widely spread (N. E. & As.)	,, ,, ,,
266	Polygonum persicaria, L.	Persicaria	,, ..	Vict. Nat., Vol. XXIV., p. 192, 1908	Widely spread (N. temp. reg.)	A weed
267	Polypogon monspeliensis, Desf.	Annual Beardgrass ..	Gramineæ ..	Benth. Fl. Aust., Vol. VII., p. 547, 1878	Widely spread (E. As., & Afr.)	Of very little use as a pasture grass
268	Poterium Sanguisorba, L.(Sanguisorba minor, Scop.)	The Salad Burnet ..	Rosaceæ ..	Benth. Fl. Aust., Vol. II., p. 434, 1869	General (E., As., & Afr.)	Useful for sheep fodder on poor soils

* Wrongly known as "Phalaris commutata," the cultivated form of which is recognised by Hackel as a new species, *P. stenoptera*. Feddes Repertorium, Vol. V., p. 333, 1908.

No.	Botanical Name.	Common Name.	Natural Order.	Date and place of first published record of Naturalization.	Local distribution and original home.	Character.
269	Psoralea pinnata, L. ..	Pinnate Psoralea ..	Leguminosæ ..	Vict. Nat., Vol. X., p. 145, 1893	Widely spread (S. Afr.)	Probably a garden escape
270	Ranunculus arvensis, L.	Corn Buttercup ..	Ranunculaceæ ..	Vict. Nat., Vol. X., p. 144, 1893	Widely spread (E. & As.)	A weed
271	Ranunculus muricatus, L.	Sharp-pointed Crowfoot	,, ..	Benth. Fl. Aust., Vol. I., p. 15, 1863	General (E., As., & Afr.)	,,
272	Ranunculus repens, L...	Creeping Crowfoot ..	,, ..	Proc. Roy. Soc. of Vict., Vol. XXII., 1909	Widely spread (E. & As.)	,,
273	Ranunculus sceleratus, L.	Celery-leaved Ranunculus	,, ..	Roy. Soc. of Vict., Vol. XX., p. 86, 1907	East (N. temp. reg.)	,,
274	Raphanus Raphanistrum, L.	Wild Radish, or Jointed Charlock	Cruciferæ ..	Journ. of Pharm., 1887	General (E., As., & Afr.)	A troublesome weed in cultivated ground
275	Reseda Luteola, L. ..	The Weld, or Wild Mignonette	Resedaceæ ..	Proc. Roy. Soc. of Vict., Vol. XX., p. 86, 1907	Widely spread, but not plentiful (E., As., & Afr.)	A dye plant, but a weed when wild
276	Ricinus communis, L. ..	Castor Oil Plant ..	Euphorbiaceæ ..	Key to Vict. Pl., 1887–8	Widely spread (As. & Afr.)	Garden and cultivated plant
277	Romulea cruciata, Ker-Gawl.	Pink Star, Onion Grass, or Guildford Grass	Irideæ ..	Benth. Fl. Aust., Vol. VI.,* p. 399, 1873	General (S. Afr.) ..	Proclaimed for the whole State
278	Rosa rubiginosa, L. ..	Sweet Briar	Rosaceæ ..	Benth. Fl. Aust., Vol. II., p. 432, 1864	General (E., As., & Afr.)	,, ,, ,,
279	Rosmarinus officinalis, L.	Rosemary	Labiatæ ..	Benth. Fl. Aust., Vol. V., p. 73, 1870	Widely spread (E., As., & Afr.)	A weed when wild
280	Rubus fruticosus, L. ..	Blackberry	Rosaceæ ..	Journ. of Pharm., 1887	General (E.) ..	Proclaimed for the whole State
281	Rubus laciniatus, Willd.	Jagged-leaved Bramble..	,, ..	Proc. Roy. Soc. of Vict., Vol. XXII., 1909	Widely spread ..	A useless plant
282	Rumex Acetosella, L. ..	Sorrel-weed	Polygonaceæ ..	Benth. Fl. Aust., Vol. V., p. 265, 1870	General (E., As., & Afr.)	A pest in cultivated ground
283	Rumex conglomeratus, Murray	Clustered Dock ..	,, ..	Benth. Fl., Aust., Vol. V., p. 263, 1870	General (E., As., & Afr.)	A pest in badly drained or neglected ground
284	Rumex crispus, L. ..	Curled Dock	,, ..	Benth. Fl. Aust., Vol. V., p. 263, 1870	General (E., As., & Afr.)	,, ,, ,,
285	Rumex obtusifolius, L.	Broad-leaved Dock ..	,, ..	Journ. of Pharm., 1887	Widely spread (E., As., & Afr.)	,, ,, ,,

286	Rumex pulcher, L. ..	Fiddle Dock	,, ..	Benth. Fl. Aust., Vol. V., p. 264, 1870	Widely spread (E. & As.)	,, ,, ,,
287	Salvia pratensis, L. ..	Meadow Sage ..	Labiatæ ..	Benth. Fl. Aust., Vol. V., p. 86, 1870	North-East (E. & As.)	A weed
288	Salvia sclarea, L. ..	Common Clary ..	,, ..	Benth. Fl. Aust., Vol. V., p. 86, 1870	North-East (E., As., & Afr.)	,,
289	Salvia verbenacea, L. ..	Wild Sage	,, ..	Benth. Fl. Aust., Vol. V., p. 86, 1870	General (E. & As.)	,,
290	Saponaria vaccaria, L...	Bladder or Cow Soapwort	Caryophyllaceæ	Key to Vict. Pl., 1887–8	General (E., As., & Afr.)	A troublesome weed, especially in cornfields
291	Scabiosa maritima, L. ..	Pincushion	Dipsacaceæ ..	Key to Vict. Pl., 1887–8	Widely spread (Med. reg. & Canary Is.)	A weed
292	Scandix Pecten Veneris, L.	Shepherd's Needle, or Venus's Comb	Umbelliferæ ..	Journ. of Pharm., 1887	Widely spread (E., As., & Afr.)	,,
293	Scolymus hispanicus, L.	Golden Thistle ..	Compositæ ..	Proc. Roy. Soc., Vol. XX., p. 87, 1907	Widely spread (Med. reg.)	,,
294	Scorpiurus sulcata, L. ..	Caterpillar or Scorpion Plant	Leguminosæ ..	Vict. Nat., Vol. X., p. 145, 1893	North-East (Med. reg.)	,,
295	Senebiera Coronopus, Poir.	Swines' Cress ..	Cruciferæ ..	Benth. Fl. Aust., Vol. I., p. 83, 1863	General (E., As., & Afr.)	,,
296	Senebiera didyma, Pes.	Lesser Swines' Cress ..	,, ..	Benth. Fl. Aust., Vol. I., p. 83, 1863	General (Am.) ..	,,
297	Senecio elegans, L. ..	Cape Senecio, or Purple Groundsel	Compositæ ..	Vict. Nat., Vol. XXII., p. 79, 1905	Widely spread (S. Afr.)	,,
298	Senecio Jacobæa, L. ..	Ragwort	,, ..	Journ. of Agric. of Vict., Vol. V., p. 680, 1907	Widely spread (E. & As.)	Proclaimed for seven shires
299†	Senecio mikanioides, Otto	Cape Ivy	,, ..	Vict. Nat., Vol. XXIV., p. 16, 1907	Widely spread (S. Afr.)	A troublesome weed if allowed to spread
300	Senecio vulgaris, L. ..	Groundsel	,, ..	Journ. of Pharm., 1887	General (E.) ..	Useful for cage birds

* This Irid was recorded under the name of *Trichonema ochroleuca*, Ker, in Benth. Fl. Vol. VI., p. 399 (1873), and as *Trichonema bulbocodium*, Ker, in the Journ. of Pharm. 1887, also as *Romulea bulbocodium*, Sebast., in the Key to Vict. Plants, in 1887–8, and as *Romulea cruciata*, Ker-Gawl., in the Proc. Roy. Soc. of Victoria, Vol. XIX., p. 43 (1906). In Tasmania and New South Wales it was known as *R. rosea*, Ecklon (*Trichonema rosea*, Ker Gawl.), whereas it was shown that in its short style it resembled the *Romulea* (*Trichonema*) *cruciata* of Ker-Gawl. Kew does not consider this character constant or the species valid, but considers *R. rosea* and *R. bulbocodium* to be conspecific, the latter name standing. The English *R. bulbocodium* is now *R. columnæ*, Seb. I have not as yet found any Australian specimens to vary as regards the relative length of style and stamens to any appreciable extent, although Battandier (Bull. Soc. Bot. de France, 1889), states that this character is a highly variable one. So long as *Romulea* (*Trichonema*) *cruciata*, Ker-Gawl., is upheld, the name *R. cruciata*, Ecklon, is invalid for priority reasons; and this plant requires a new name if it really represents a specific identity, which is doubtful, as no specimens of it appear to exist. Prof. Beguinot has revived the *Romulea cruciata* of Jacquin and refers our plant to *R. rosea*, Eckl., var *parviflora*, Beg. In the Ann. du Cons. et du Jard. Bot. de Geneve, pp. 14–15 (1907–8), Beguinot gives a variety *parviflora* under *R. cruciata*, but not under *R. rosea*, and makes no reference to Baker's *R. longifolia*, which is undoubtedly the same as our plant. Hence, for the present, this vexed question is not yet definitely settled, and the name under which this plant was proclaimed can be retained.

† In the Journ. of Pharm. (1887), this plant was recorded as *Senecio scandens*, D.C., which is, however, only a synonym to *S. mikanioides*, Otto.

No.	Botanical Name.	Common Name.	Natural Order.	Date and place of first published record of Naturalization.	Local distribution and original home.	Character.
301	Setaria macrostachya, H. B. & K.	Bearded Setaria, or large Pigeon Grass	Gramineæ ..	Vict. Nat., Vol. XXIV., p. 16, 1907	North-East (As. & Trop. Aus.)	Of some use as a pasture grass
302	Setaria verticillata, Beauv.	Whorled Setaria, Pigeon Grass, or Bristle Plant	,, ..	Vict. Nat., Vol. XXIV., p. 192, 1908	General (Cosmop.)	,, ,, ,,
303	Setaria viridis, Beauv...	Green Setaria, or Pigeon Grass	,, ..	Vict. Nat., Vol. XXIV., p. 192, 1908	General (Cosmop.)	A fairly good pasture grass
303A	,, var. imberbis (Setaria nigrirostris, Durand & Schinze)	Smooth Setaria, or Pigeon Grass	,, ..	Vict. Nat., Vol. XXIV., p. 192, 1903	General (Afr.) ..	A useful pasture grass
304	Sherardia arvensis, L. ..	Field Madder ..	Rubiaceæ ..	Journ. of Pharm., 1887	General (E., As., & Afr.)	A weed
305	Silene Cucubalus, L. ..	Bladder Campion ..	Caryophyllaceæ	Key to Vict. Pl., 1887–8	General (E., As., & Afr.)	,,
306	Silene gallica, L. ..	French Catchfly ..	,,	Benth. Fl. Aust., Vol. I., p. 155, 1863	General (E., As., & Afr.)	,,
307	Sisymbrium orientale, L. (Sisymbrium Columnæ, Jacq.)	Indian Hedge Mustard	Cruciferæ ..	Vict. Nat., Vol. XIX., p. 159, 1903	North-West (E. & As.)	,,
308	Sisymbrium officinale, L.	Hedge Mustard ..	,, ..	Journ. of Pharm., 1887	General (E., As., & Afr.)	,,
309	Sisyrinchium Bermudianum, L.	Bermuda Pig-root ..	Irideæ ..	Benth. Fl. Aust. Vol. VI., p. 412, 1873	Widely spread (Am.)	Weed injurious to stock
310	Sisyrinchium micranthum, L.	Scour Weed	,, ..	Key to Vict. Pl., 1887–8	Widely spread (Am.)	,, ,, ,,
311	Solanum heterandrum, Pursh.	Pincushion Nightshade	Solanaceæ ..	Vict. Nat., Vol. XXIV., p. 194, 1908*	North-West & N. (N. Am.)	Prickly weed
312	Solanum marginatum, L. f.	White-edged Nightshade	,, ..	Vict. Nat., Vol. X., p. 145, 1893	South-West (E., As., & Afr.)	Weed, not very common
313	Solanum pseudo-capsicum, L.	Madeira Winter Cherry, or False Capsicum	,, ..	Journ. of Pharm., 1887	Widely spread (Am.)	A weed
314	Solanum sodomæum, L.	Apple of Sodom ..	,, ..	Benth. Fl. Aust., Vol. IV., p. 458, 1869	General (E., As., & Afr.)	Poisonous. Proclaimed for the whole State
315	Soliva sessilis, Ruiz. & Pav.	Stalkless Soliva ..	Compositæ ..	Vict. Nat., Vol. X., p. 151, 1894	Widely spread (Am.)	A weed

316	Sonchus oleraceus, L. ..	Sow Thistle	,, ..	Benth. Fl. Aust., Vol. III., p. 679, 1866	General (E., As., & Afr.)	,,
317	Sparaxis grandiflora, Ker-Gawl.	Harlequin Flower ..	Irideæ ..	Key to Vict. Pl., 1887–8	Widely spread (Afr.)	A weed when wild
318	Sparaxis tricolor, Ker-Gawl.	Three-coloured Harlequin Flower	,, ..	Benth. Fl. Aust., Vol. VI., p. 399, 1873	Widely spread (Afr.)	,, ,,
319	Spergula arvensis, L. ..	Corn Spurry	Caryophyllaceæ	Benth. Fl. Aust., Vol. I., p. 161, 1863	General (E., As., & Afr.)	A weed of cornfields, &c.
320	Spergula pentandra, L.	Five-stamened Spurry ..	,, ..	Key to Vict. Pl., 1887–8	Widely spread (E., As., & Afr.)	A weed
321	Stachys arvensis, L. ..	Wound-wort or Stagger-weed	Labiatæ ..	Benth. Fl. Aust., Vol. V. p. 73, 1870	General (E., As., & Afr.)	,,
322	Stellaria media, L. ..	Chickweed	Caryophyllaceæ	Benth. Fl. Aust., Vol. I. p. 159, 1863	General (E., As., & Afr.)	A weed of cultivation
323	Stenotaphrum americanum, Schrank.	Buffalo Grass ..	Gramineæ ..	Journ. of Pharm., 1887	Widely spread by cultivation (Am.)	A useful grass for dry garden lawns
324	Taraxacum officinale, Weber.	Dandelion	Compositæ ..	Benth. Fl. Aust., Vol. III., p. 680, 1866	General (E., As., Afr., & Am.)	A weed
325	Tragopogon porrifolius, L.	Salsify	,, ..	Journ. of Pharm., 1887	General (E., As., & Afr.)	,,
326	Trifolium angustifolium, L.	Narrow-leaved Clover ..	Leguminosæ ..	Vict. Nat., Vol. XXIV., p. 16, 1907	Widely spread ..	,,
327	Trifolium arvense, L. ..	Hare's-foot Clover ..	,, ..	Journ. of Pharm., 1887	General (E., As., & Afr.)	,,
328	Trifolium fragiferum, L.	Perennial Strawberry Clover	,, ..	Vict. Nat., Vol. XX., p. 14, 1903	General (E., As., & Afr.)	A very good pasture plant
329	Trifolium glomeratum, L.	Clustered Clover ..	..	Vict. Nat., Vol. X., p. 145, 1892	General (E., As., & Afr.)	Of slight use as a pasture plant
330	Trifolium hybridum, L.	Alsike Clover ..	,, ..	Vict. Nat., Vol. XXIV., p. 192, 1908	Naturalized by cultivation (E., As., & Afr.)	A good fodder plant
331	Trifolium incarnatum, L.	Carnation Clover ..	,, ..	Vict. Nat., Vol. XXIV., p. 192, 1908	Widely spread, but not plentiful (E.)	Of slight use as a fodder plant
332†	Trifolium minus, Rel. ..	Slender Clover ..	,, ..	Benth. Fl. Aust., Vol. II., p. 186, 1864	General (E.) ..	Of very slight use as a pasture plant
333	Trifolium parviflorum, Ehrh.	Small-flowered Clover ..	,, ..	Vict. Nat., Vol. XX., p. 49, 1903	Widely spread (E., As., & Afr.)	Too small to be of much use as a fodder plant

* Here recorded as an exotic not yet naturalized.
† Recorded in Benth. Fl. Aust., Vol. II., also Key to Vict. Plants, as *T. procumbens*, L., which is a much larger plant.

No.	Botanical Name.	Common Name.	Natural Order.	Date and place of first published record of Naturalization.	Local distribution and original home.	Character.
334	Trifolium pratense, L. ..	The Red Clover ..	Leguminosæ ..	Benth. Fl. Aust., Vol. II., p. 186, 1864	General (E., As., & Afr.)	A useful pasture plant
335*	Trifolium procumbens, L.	Yellow or Annual Hop Clover	,, ..	Benth. Fl. Aust., Vol. II., p. 186, 1864	General	Of slight use as a pasture plant
336	Trifolium repens, L. ..	White Clover, or Dutch Clover	,, ..	Benth. Fl. Aust., Vol. II., p. 186, 1864	General (E., As., Afr., & Am.)	A good pasture plant
337	Trifolium resupinatum, L.	Annual Strawberry Clover	,, ..	Key to Vict. Pl., 1887–8	General (E., As., & Afr.)	An annual pasture plant, but of slight fodder value
338	Trifolium scabrum, L. ..	Rough Clover ..	,, ..	Vict. Nat., Vol. XXIII., p. 184, 1907	South-West (E., As., & Afr.)	A weed
339	Trifolium striatum, L. ..	Knotted Clover ..	,, ..	Vict. Nat., Vol. XXIII., p. 184, 1907	Widely spread (E. & As.)	Of very slight pasture value
340	Trifolium subterraneum, L.	Subterranean Clover ..	,, ..	Key to Vict. Pl., 1887–8	General (E., As., & Afr.)	Of use as a pasture plant; also helps to suppress annual weeds
341	Trifolium tomentosum, L.	Woolly-headed Clover ..	,, ..	Journ. of Pharm., 1887	General (E., As., & Afr.)	Of slight value as a pasture plant
342	Trigonella ornithopodioides, L.	Bird's-foot Trigonel, or Fenugreek	,, ..	Proc. Roy. Soc. of Vict., Vol. XX., p. 87, 1907	South-West (E.) ..	Of slight value in pasture
343	Trisetum pratense, Pers. (Avena flavescens, L.)	Yellowish Oat Grass ..	Gramineæ ..	Vict. Nat., Vol. XXIV., p. 192, 1908	Widely spread (E., As., & Afr.)	A useful perennial pasture grass
344†	Tunica prolifera, Scops.	Productive Carnation ..	Caryophyllaceæ	Vict. Nat., Vol. XX., p. 88, 1903	General	A weed
344A	,, var. velutina, (T. velutina, Fisch. & Mey.)	Velvet Carnation ..	,, ..	Vict. Nat., Vol. X., p. 145, 1893	General	,,
345	Ulex europæus, L. ..	Furze or Gorse ..	Leguminosæ ..	Journ. of Pharm., 1887	General (E. & Afr.)	A hedge plant. Proclaimed for the whole State
346	Urtica dioica, L. ..	Tall Nettle	Urticaceæ ..	Journ. of Pharm., 1887	General (E., As., & Afr.)	A weed
347	Urtica urens, L. ..	Dwarf Nettle ..	,, ..	Benth. Fl. Aust., Vol. VI., p. 191, 1873	General (E., As., & Afr.)	,,
348	Valerianella dentata, Pollich (V. microcarpa, Loisel)	Narrow-fruited Corn Salad	Valerianaceæ ..	Vict. Nat., Vol. XXII., p. 79, 1905	South-West (E. & N. As.)	,,

349	Verbascum Blattaria, L.	Spurious Mullein ..	Scrophulariaceæ	Benth. Fl. Aust., Vol. IV., p. 473, 1869	General (E., As., & Afr.)	A troublesome weed
350	Verbascum Thapsus, L.	Great Mullein ..	,, ..	Journ. of Pharm., 1887	Widely spread, but not plentiful (E. & As.)	A weed
351	Verbena bonariensis, L.	Cluster-flowered Vervein	Verbenaceæ ..	Journ. of Pharm., 1887	Widely spread, but not plentiful (Trop. reg.)	,,
352	Verbena venosa, Gill & Hook.	Veined Vervein ..	,, ..	Vict. Nat., Vol. XXIV., p. 192, 1908	Widely spread (Argentine reg.)	,,
353	Veronica agrestis, L. ..	Procumbent Speedwell	Scrophulariaceæ	Vict. Nat., Vol. XXIV., p. 16, 1907	Widely spread (E., As., & Afr.)	,,
354	Veronica arvensis, L. ..	Wall Speedwell ..	,,	Vict. Nat., Vol. X., p. 145, 1893	Widely spread (E., As., & Afr.)	,,
355	Veronica Buxbaumi, Ten.	Buxbaum's Speedwell ..	,, ..	Journal of Pharm., 1887	Widely spread (E., As., & Afr.)	,,
356	Vicia angustifolia, Roth.	Narrow-leaved Vetch ..	Leguminosæ ..	Key to Vict. Pl., 1887–8	Widely spread (E., As., & Afr.)	Useful for fodder or green manuring, but often troublesome among grain or other crops
357	Vicia hirsuta, Koch. ..	Lentil Tare	,, ..	Benth. Fl. Aust., Vol. II., p. 241, 1864	Widely spread (E., As., & Afr.)	,, ,, ,,
358	Vicia sativa, L. ..	The Vetch or Tare ..	,, ..	Benth. Fl. Aust., Vol. II., p. 241, 1864	General (E., As., & Afr.)	,, ,, ,,
359	Vinca major, L. ..	Blue or Greater Periwinkle	Apocynaceæ ..	Journ. of Pharm., 1887	Widely spread (E., As., & Afr.)	Decorative garden plant
360	Vinca rosea, L. ..	Pink Periwinkle ..	,, ..	Key to Vict. Pl., 1887–8	Widely spread (As. & Afr.)	,, ,, ,,
361	Viola odorata, L. ..	The Violet	Violaceæ ..	Vict. Nat., Vol. X., p. 144, 1893	Widely spread (E., As., & Afr.)	An escape from gardens, &c.; now naturalized
362	Watsonia Meriana, Mill., var. iridifolia	Merian's Bugle Lily ..	Irideæ	Vict. Nat., Vol. XXIV., p. 16, 1907	Widely spread (S. Afr.)	A troublesome pest
363	Xanthium spinosum, L.	Bathurst Burr ..	Compositæ ..	Benth. Fl. Aust., Vol. III., p. 525, 1866	General (E., As., & Afr.)	A bad weed. Proclaimed for the whole State
364‡	Zostera marina, L. ..	Grass Wrack	Naiadaceæ ..	Vict. Nat., Vol. XXII., p. 79, 1905	South-West (E.) ..	A marine plant

* Recorded in Benth. Fl. Aust., Vol. II., also Key to Vict. Plants, as *T. agrarium*, L., which is a perennial plant, not as yet naturalized in this State. See Bentham and Hooker's Handbook of the British Flora, *re* these two plants.

† See also Proc. Roy. Soc. of Vict., Vol. XX., p. 139 (1907–8).

‡ We have seen no Victorian specimens of this plant.

NATURAL ORDERS ARRANGED SYSTEMATICALLY ACCORDING TO BENTHAM & HOOKER'S GENERA PLANTARUM.

(The numbers refer to the preceding list of Aliens.)

THALAMIFLORÆ.

Ranunculaceæ (4)—
270, 271, 272, 273.
Papaveraceæ (5)—
35, 149, 235, 236, 237.
Fumariaceæ (3)—
143, 143A, 143B.
Cruciferæ (19)—
16, 55, 56, 57, 71, 72, 89, 116, 117, 129, 130, 176, 177, 220, 274, 295, 296, 307, 308.
Resedaceæ (1)—
275.
Violaceæ (1)—
361.
Polygalaceæ (1)—
263.
Caryophyllaceæ (15)—
34, 87, 88, 115, 152, 185, 186, 290, 305, 306, 319, 320, 322, 344, 344A.
Portulacaceæ (1)—
69.
Hypericaceæ (2)—
160, 161.
Malvaceæ (6)—
154, 191, 192, 193, 194, 216.

DISCIFLORÆ.

Geraniaceæ (5)—
127, 128, 232, 233, 234.

CALYCIFLORÆ.

Leguminosæ (40)—
10, 109, 110, 184, 197, 198, 199, 200, 201, 202, 203, 204, 205, 207, 208, 226, 227, 269, 294, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 345, 356, 357, 358.
Rosaceæ (5)—
11, 268, 278, 280, 281.
Onagrariaceæ (2)—
224, 225.
Cucurbitaceæ (2)—
105, 118.
Cactaceæ (1)—
229.
Ficoideæ (4)—
144, 211, 212, 213.
Umbelliferæ (10)—
22, 79, 80, 98, 103, 113, 142, 242, 243, 292.

GAMOPETALÆ.

Rubiaceæ (2)—
146, 304.
Valerianaceæ (1)—
348.
Dipsacaeæ (1)—
291.
Compositæ (53)—
1, 28, 29, 30, 33, 39, 49, 50, 70, 73, 74, 75, 76, 77, 78, 83, 84, 85, 86, 94, 95, 96, 97, 100, 101, 102, 104, 107, 125, 126, 145, 150, 153, 162, 163, 164, 168, 171, 190, 196, 228, 251, 252, 293, 297, 298, 299, 300, 315, 316, 324, 325, 363.

GAMOPETALÆ—*continued.*

Campanulaceæ (1)—
(Lobeliaceæ)—
180.
Primulaceæ (2)—
25, 189.
Apocynaceæ (2)—
359, 360.
Asclepiadaceæ (1)—
151.
Polemoniaceæ (1)—
147.
Boraginaceæ (4)—
12, 24, 119, 179.
Convolvulaceæ (3)—
99, 106, 223.
Solanaceæ (7)—
112, 187, 188, 221, 222, 311, 312, 313, 314.
Scrophulariaceæ (11)—
46, 47, 48, 81, 178, 215, 349, 350, 353, 354, 355.
Verbenaceæ (2)—
351, 352.
Labiatæ (12)—
174, 175, 195, 209, 210, 218, 230, 279, 287, 288, 289, 321.
Plantaginaceæ (3)—
253, 254, 255.

APETALÆ.

Amarantaceæ (5)—
17, 18, 19, 20, 21.
Chenopodiaceæ (8)—
40, 41, 51, 90, 90A, 91, 92, 93.
Phytolaccaceæ (1)—
250.
Polygonaceæ (9)—
124, 264, 265, 266, 282, 283, 284, 285, 286.
Euphorbiaceæ (4)—
131, 132, 133, 276.
Urticaceæ (2)—
346, 347.

MONOCOTYLEDONES.

Irideæ (10)—
148, 157, 165, 219, 277, 309, 310, 317, 318, 362.
Liliaceæ (2)—
37, 38.
Pontederiaceæ (1)—
121.
Juncaceæ (2)—
166, 167.
Naiadaceæ (1)—
364.
Gramineæ (89)—
2, 3, 4, 5, 6, 7, 8, 9, 13, 14, 15, 23, 26, 27, 31, 32, 36, 42, 43, 44, 45, 52, 53, 54, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 82, 108, 111, 114, 120, 122, 123, 134, 135, 136, 137, 138, 139, 140, 141, 155, 156, 158, 159, 169, 170, 172, 173, 181, 182, 183, 206, 214, 217, 231, 238, 239, 240, 241, 244, 245, 246, 247, 248, 249, 256, 257, 258, 259, 260, 261, 262, 267, 301, 302, 303, 303A, 323, 343.

EXOTICS NOT YET SUFFICIENTLY ESTABLISHED TO BE CONSIDERED NATURALIZED.

For distribution, &c., see *Journal of Pharmacy* (1887); *Journal Royal Society of New South Wales*, Vol. XLII., p. 197 (1908); *Victorian Naturalist*, Vol. X., p. 144 (1893). and Vol. XXIV., p. 192 (1903); *Journal Royal Society of Victoria*, Vol. XXII. (1909),

(Seventy-two species from sixty-six genera.)

Amaranthus deflexus, L.
Ambrosia artemisifolia, Mayn. & Walp.
Andropogon saccharoides, Sw.
Antirrhinum Orontium, L.
Arctotis argentea, Thunb.
Argemone ochroleuca, Sw.
Avena sterilis, L.
Borago officinalis, L.
Calycotome spinosa, Link.
Carbena benedicta, Adans.
Cenchrus echinatus, L.
Centaurea cyanus, L.
Charieis heterophylla, Cass.
Cistus salvifolius, L.
Cleome graveolens, Rafin.
Collomia linearis, Nutt.
Conringia orientalis, Don. (Erysimum orientale, Mill.)
Crepis virens, L.
Cyperus vegetus, Willd.
Datura Metel, L.
Delphinium consolida, L.
Dimorphotheca pluvialis, Moench.
Digitalis purpurea, L.
Dipsacus fullonum, L.
Eragrostis major, Host.
Galium murale, All.
Gilia achilleaefolia, Benth.
Grindelia squarrosa, Dunal.
Hordeum maritimum, With.
Humulus Lupulus, L.
Hyoscyamus albus, L.
Ixia erecta, Berg.
Lathyrus latifolius, L.
Lathyrus sativus, L.
Lavatera arborea, L.
Leonotis Leonurus, R. Br.
Leontodon hirtus, L.
Linaria genistifolia, Mill.
Linaria Pelisseriana, L.
Linaria versicolor, Mœnch.
Lunaria annua, L. (Lunaria inodora, Lam.)
Lycium afrum, L.
Matricaria Chamomilla, L.
Mesembryanthemum angulatum, Thunb.
Mesembryanthemum falciformis, Haw.
Oenothera acaulis, Cav.
Ononis spinosa, L.
Opuntia vulgaris, Haw.
Oxalis purpurata, Jacq.
Papaver argemone, L.
Pascalia glauca, Orteg.
Pelargonium graveolens, L'Herit.
Phalaris intermedia, Bosc.
Phleum tenue, Schrad.
Physalis angulatum, L.
Physalis peruviana, L.
Pimpinella Anisum, L.
Plectranthus Cœtsa, Buch.-Ham.
Poa arachnifera, Torr.
Raphanus sativus, L.
Saponaria officinalis, L.
Solanum eleægnifolium, Cav.
Sparaxis bulbifera, Ker.-Gawl.
Tetrogona decumbens, Mill.
Tetragona fruticosa, L.
Trifolium supinum, L.
Trigonella Fœnum-græcum, L.
Ursinia chrysanthemoides, Haw.
Verbesina encelioides, Benth. & Hook. f.
Vicia tetrasperma, Mœnch.
Viola tricolor, L.
Zygophyllum sessilifolium, L.

GLOSSARY OF TECHNICAL TERMS.

ACHENE, small one-seeded seed-like fruit.
ACRID, having a biting taste.
ADNATE, adhering to.
AGGLUTINATION, sticking together.
ALBUMINOID, resembling white of egg.
ALGÆ, plants of the sea-weed group.
ALIENS, plants not native to Victoria.
ALKALINITY, the condition due to the presence of free alkali (potash, soda, lime, &c.).
ALKALOID, nitrogenous substances, frequently poisonous.
ALTERNATE, singly arranged leaves are alternate.
ANNUALS, plants lasting less than one year.
ANTHERS, the male or pollen-bearing organs of flowers.
APEX, the growing end of a root, stem, or branch.
APICAL, at the apex.
ARABLE, under the plough.
ARCHAIC, ancient.
AXILLARY, occurring in the axil of a leaf where it joins the stem.
AXIL, the upper angle between the junction of the leaf with the stem.
AXIS, the main axis of the plant includes both stem and root.
AROMA, scent or fragrance.
AROMATIC, having an aroma.
ARSENITE OF SODA, a compound of soda and white arsenic.
ASPHYXIATION, a condition produced by the absence of air (oxygen) in plants or animals.
ASTRINGENT (ADSTRINGENT), having tightening up properties (medicinal).
ATROPIN, a poisonous alkaloid.
BASAL, at the base.
BIENNIAL, lasting for two years.
BI-SEXUAL, a bi-sexual flower contains both stamens and carpels.
BRACT, the leaf in whose axil a flower or flowering shoot arises.
BULBIL, small cluster of swollen leaves capable of producing new plants.
BULB, a condensed stem surrounded by fleshy leaves.
CALCAREOUS, chalky.
CALCIUM, the metal contained in chalk and lime, and essential as a plant food.
CALCIUM CHLORIDE, the compound with hydrochloric (muriatic) acid (spirits of salt).
CALYX, the united series of green parts outside a flower.
CAMPANULATE, bell shaped.
CAPSULE, a many seeded pod formed from several carpels and splitting in various ways.
CARBONATE, a compound of a base with carbon dioxide.
CARPEL, the female organ of the flower in which the seeds develop.
CATCH-CROP, a crop of short duration, grown between two main ones.
CEREALS, grasses yielding grain for food.
CIRRHOSIS, a disease in which the glandular tissue of the liver is replaced by connective tissue, and becomes hard or enlarged.
CLEFT, split.
COLUMN, the central axis in an orchid flower formed by the union of the stamen and style.
COMPOSITE, plant whose apparent flowers are composed of numerous small ones (florets).
CONIIN, the poisonous alkaloid of Hemlock.
CORDATE, heart-shaped.
COROLLA, the united ring of parts (petals) usually coloured, within the calyx.
CORM, a swollen underground stem, surrounded by dry scale leaves.
COSMOPOLITAN, found all over the world.

GLOSSARY—*continued.*

COTYLEDON, the first seed leaf of the embryo plant.
CUMARIN, the volatile odoriferous principle giving Melilotus the scent of new mown hay.
CYCLIC, occurring in cycles. A term used when a weed waxes and wanes in numbers at intervals of years.
CYME, a group of flowers in which the main axes are short and end in terminal flowers.
DATURIN, the poisonous alkaloid of the Thorn Apple.
DEHISCENT, splitting open to shed the seeds.
DEFLECTED, bent back.
DILATED, swollen or distended.
DISC, the central portion of the flower head of a Composite.
DISC-FLORETS, the small central flowers of a Composite head.
DIURETIC, increasing the production of urine.
DUBOISIN SULPHATE, the compound of the poisonous alkaloid, duboisin, with sulphuric acid, sometimes used by oculists.
ECONOMIC, having a useful, or utilitarian, value.
ERGOTIN, the poisonous principle of ergot.
EXOTIC, not native to this country.
FETID, having a bad smell.
FIRE-WEED, a weed which springs up after fires.
FLACCID, drooping or not tense or turgid.
FLORA, the plants of a country or district.
FLORETS, the small flowers of a Composite head.
FLOWERING AXIS, the stem on which flowers are borne.
FLOWERING GLUME, the outer scale-like bract enclosing a single grass flower, several of which usually form each small "spikelet."
FULVOUS, reddish yellow.
FUNICLE, the stalk of a seed.
FUNGUS, plants belonging to the group of the moulds, mushrooms, and puff balls.
FUNGI, plural of fungus.
GASTRO-ENTERITIS, inflammation of the stomach and intestine.
GITHAGIN, the poisonous principle of the purple Corn Cockle.
GLABROUS, without hairs.
GLANDULAR, having organs or glands capable of excreting liquids or dissolved solids.
GLOBOSE, rounded.
GLUMES, the scaly bracts of a grass spikelet.
HÆMATURIA, a disease characterized by the escape of blood pigment in the urine.
HOMOGENEOUS, all alike.
HUMUS, decayed animal and vegetable matter, mainly the latter.
HYPODERMIC, beneath the skin.
INCISED, cut or deeply indented from the margin.
INDEFINITE, numerous, or more than twelve.
INFLATED, swollen or distended.
INFLORESCENCE, a cluster of flowers.
INNOCUOUS, harmless, not poisonous or injurious.
INVOLUCRE, the bract or bracts enclosing an inflorescence (group of flowers or Composite head).
KEEL, the two lowest united petals in a flower of the pea type.
LANCEOLATE, lance shaped.
LARYNX, the voice organ of mammals, the "Adam Apple" of the throat.
LATHYRISM, a paralytic affection due to eating the Indian Pea.
LEAFLETS, the segments of a compound leaf.
LEAF-SHEATH, the basal part of the leaf which sometimes wraps round the stem.
LEGUME, the pod-like fruit of the pea family, which splits into two halves lengthwise when ripe.
LEGUMINOUS, belonging to the pea family and having the same type of fruit.
LETHARGIC, lazy, sleepy, disinclined to exertion.
LINEAR, narrow, and of nearly equal breadth throughout.
LOBES, the free projecting segments of a calyx, corolla, or leaf.
LOCOED, affected by a poison usually causing more or less complete paralysis or madness.
LUPINOTOXINE, the poisonous principle of lupins.
MARRUBIN, the fragrant medicinal principle of the Horehound.
MIDRIB, the central vein of a leaf.

GLOSSARY—*continued.*

MILLIMETRE, $\frac{1}{25}$ of an inch.
MORBID, unnatural.
MUCILAGE, a gummy product or exudation from plants.
MUCOUS MEMBRANE, the lining of the digestive canal.
NARCOTIC, producing sleep, insensibility, or death.
NEURITIS, inflammation of the nerves.
NEURITIS (PERIPHERAL), inflammation of the nerve-endings.
NITRATE, a compound of nitric acid with a base.
NITRIFICATION, the process by which nitrogenous organic matter is converted into nitrates by micro-organisms if lime or a similar base is present.
NITROGEN, the chief constituent of the atmosphere, and one of the most important elements of plant and animal food.
NUTLETS, the little nut-like or seed-like fruits into which the fruit of a sage or dead-nettle splits.
OBCORDATE, heart shaped, with the point to the stalk.
OBLIQUE, neither horizontal nor perpendicular.
OBLONG, longer than broad, with nearly parallel sides.
OBOVATE, oval, but broader at the outer end.
OBOVATE-OBLONG, intermediate between the two preceding shapes.
OLFACTORY, having the sense of smell.
ORBICULAR, flat, with a circular outline.
OVARY, the part in which the seeds develop.
OVARY (INFERIOR), when the ovary is sunk in the flower stalk below the insertion of sepals, petals, and stamens.
OVARY (SUPERIOR), the base not below the insertion of the other parts of the flower.
OVATE, egg-shaped with the broader end basal.
OVOID, egg-shaped.
PALMATE, shaped like the hand.
PANICLE, a loose flower cluster.
PAPPUS, the tuft of hairs on the seed-like fruits of Composites, &c., or on the seeds of other plants.
PARASITIC, growing on, and at the expense of, another plant or animal.
PARTITE, divided into pieces or segments.
PEDICEL, the stalk of a flower.
PERENNIAL, a plant living for several years.
PERIANTH, the leaf-like parts enclosing the stamens and carpels in a flower.
PERIPHERAL-NEURITIS, inflammation of the nerve endings.
PETALOID, petal-like.
PETALS, the coloured leaf-like parts of a flower, lying between the sepals and stamens.
PETIOLE, the stalk of a leaf.
PHYLLODE, a flattened leaf-like petiole (*Acacia*, &c.).
PINNATE, segmented in a feather-like manner, with the leaflets on each side of the common stalk.
PINNATIFID, partially cleft or split in pinnate fashion.
POTASSIUM, a metallic element essential as a food material for all plants and animals.
POTASSIUM NITRATE, the salt formed when nitric acid unites with potassium.
PREDILECTION, preference.
PRICKLE, a stiff pointed appendage, not containing woody tissue.
PROCLAIMED PLANT, a plant notified by the Governor in Council in the *Government Gazette* as included under the provisions of the Thistle Act.
PROSTRATE, lying flat.
PROTEIDS, nitrogenous materials like white of egg, &c., forming the bulk of the living substance, protoplasm.
PTOMAINE, a poisonous product of bacterial decomposition.
PUNGENT, pointed.
RACEME, a flowering stem with the youngest flowers at the top.
RADICAL, arising apparently from the root at the base of the stem near the ground.
RAY FLORETS, the outer petal-like florets of a Composite head.
RECEPTACLE, the top of the flower stem from which the parts of the flower arise.
REFLEXED, bent back.
RHIZOMES, more or less elongated underground stems, usually at the base of the stem.
RICININ, the poisonous principle of the Castor Oil seed.

GLOSSARY—*continued.*

ROSACEOUS, rose-like.
ROSETTE, a tuft of leaves arising at the same point.
ROOT-STOCK, a short stem resembling a stubby root.
RUNNER, a creeping branch which roots and forms new plants.
SALINE, salty.
SCALES, modified leaves, usually small, dry, and membranous, or in bulbs large and fleshy.
SEGMENTS, the pieces into which a leaf or other part may be divided.
SEPALS, the outer, usually green, and leaf-like, parts of a flower.
SESSILE, unstalked.
SHEATHING BRACT, a bract which wraps round the stem, inflorescence, or flower.
SOLANIN, the poisonous alkaloid of the genus *Solanum.*
SOLITARY, occurring singly.
SPATHULATE, spoon-shaped.
SPIKELETS, the small scaly clusters of grass flowers.
SPIKE, a flowering branch with unstalked flowers.
SPINE, a short, hard pointed branch with a central core of woody tissue.
SPORADIC, appearing in abundance at intervals of time.
STAMENS, the male organs of the flower.
STAMINODE, a sterile stamen, sometimes reduced to a mere scale.
STANDARD, the large petal at the back of a pea flower.
STIGMA, the receptive region of the style for pollen.
STIPULES, the leaf-like bodies often found at the base of a leaf stalk.
STRIATE, grooved.
STYLE, the stalk joining the stigma to the ovary.
SUCKER, a shoot arising beneath the soil, or the absorbent or attaching organ of a parasite.
SUPERPHOSPHATE, a soluble acidified compound of lime with phosphoric and sulphuric acids.
SURROGATE, a substitute or adulterant.
TANNIN, an astringent substance common in many barks (Oak, &c.).
TAP-ROOT, the descending main root.
TENDRIL, a thread-like coiling attaching organ.
TERMINAL, at the end of a stem or branch.
THALAMUS, the top of the flower stalk from which the floral parts arise.
THORN, a short, hard, pointed branch with a woody core but with few or no leaves.
TOXIC, poisonous.
TRIFID, split into three.
TRIFOLIATE, with three leaflets.
TUBERCLES, the swellings occurring on roots or stems. Those on the roots of Leguminosæ contain bacteria, and are able to use the nitrogen of the air as a food.
TUBEROUS, more or less swollen.
TUBER, a swollen stem, usually underground (Potato, &c.).
UMBELLATE, resembling an umbel.
UMBEL, a cluster of stalked flowers all arising at the same point.
UNISEXUAL, having one sex.
VALVES, the segments into which fruits may split.
VERATRIN, the poisonous alkaloid of the Veratrum Lily.
VERMIFUGE, a substance which expels worms.
VISCID, sticky.
VOLATILE, evaporating readily.
WHORL, a ring of two or more leaves.
XEROPHYTES, plants adapted to grow in dry situations where water is scanty, or in swampy or saline localities where they need to use as little as possible.

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ERRATA.

On page 73, No. 62—For *inermus*, read *inermis*.

On page 76, No. 102—For *tectorium*, read *tectorum*.

On page 76, No. 104—For *calendulacea*, read *calendulaceum*.

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